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Editorials

DENTAL PROFESSION AWAKENING TO MENACE OF STATE MEDICINE AS SET FORTH BY DOCTORS

That the medical profession has not merely been crying *"Wolf, Wolf"* in its crusade against state medicine and compulsory health insurance is being realized by the dental profession. To such an extent in fact that many of its members are taking up their pens to fight the false propaganda of the socialistic doctrines now sending their mephitic vapors through the air.

Recently in *"Medical Times"* appeared an article "The Fallacy of Health Insurance" by Floyd G. Rea, D. D. S., Brooklyn, N. Y., from which is quoted the citations below. Dr. Rea, in protest against inflicting the Bismarckian experiment upon America comments also that, "This experiment would not be so bad if Germany's effort had been successful. On the contrary, that effort has proven a dismal failure, and would be instantly overthrown if it were possible, which is not the case, either on the part of the Government or of the poor people; for many of the poor unfortunates have been paying premiums into this fraudulent mess all their lives when they might have been saving, and they are now aged paupers depending upon the starvation pittance called old age insurance which is the only thing standing between them and complete destitution."

And further

"In Germany the workman pays a premium of between 20 per cent. and 30 per cent. of his wages and payments start at the age of 14 years; therefore if he pays for the next 45 years and earns only $5.00 weekly, the total sum with interest would amount to $7,000. If he makes $17.50 weekly the amount would be $25,000. What does he receive in return? Mediocre or factory-production medicine of an indifferent character, unemployment wages of a starvation dole character, and the average old age annuity of $7.00 per month for him, $4.50 per month for his widow, and $2.50 for his orphans.

"Where does the money go, you ask? Into that bottomless pit called lay administrators, bureaus, and the construction and maintenance of gigantic and costly lay administration buildings which have become inured to graft.

"The social insurance scheme in Germany has had the effect of keeping down wages and tending to make practically all of the working population pauperized proletarians. It has also had the effect of producing vicious frauds which have been deceptive and wasteful of the funds through evasions, and workers have to be set to watch workers, while supervising physicians are set to spy on physicians.

"From the standpoint of economics this egregiously wasteful governmental fiasco in Germany has been one of constantly rising costs. In 1913 the budget for social insurance was 1,300,000,000 marks; in 1930 it rose to 6,000,000,000 which did not include expenses of public welfare which were 4,800,000,000 marks more. On the other hand, since sickness insurance has been in effect the average number of days of incapacity from ill health has risen from 5½ to 28 days although health in general has been greatly improved.

"This latter factor of sickness insurance would be a natural sequence because the border line between illness and health, between indisposition and illness, and between hypochondriacs and fakers is one which the physician cannot readily diagnose, if at all. The entire question of malingering has become so complicated that a limitation has been placed on medicines, and physicians can no longer prescribe what they think the patient needs but only those cheap remedies listed in a book of medical regulations for insurance purposes. The meaning is that the genuine patient suffers lack of care and the lay bureaucratic apparatus inserts itself between physician and patient."

GOOD PHARMACY IS MEDICINE'S COOPERATING HAND-MAID

There can be no permanent peace, nor deep amity between physician and pharmacist, until the pharmacist shrives himself of his sins against the medical profession. No matter what contra grief the pharmacist or dispensing chemist may have against the physician, nothing is so reprehensible as the pernicious, prevalent and often illegal practice of "counter-prescribing" so freely indulged in in such a multitude of drug stores. The average pharmacist is suffering from much of the same affliction as now makes the "overtrained" nurse, anathema in the eyes of practical physicians. Standardized pharmaceuticals have been placed conveniently to the physicians' hands. Such is the worth and merit of so many of them that it is easy to understand why pharmacists and drug clerks fall into the error of "counter-prescribing." *"Facilis descensus Averni."* And the best *"rx"* against condoning an error is not to make it. "Counter-prescribing" has been with us since the days when the lad who had picked primroses as carelessly as bounteously sneaked into the back door of the drugstore for a furtive dose of copaiba or methylene blue rather than face the family doctor.

The Narcotic Act has brought up a keen cause of dissension based largely on that fact that in some instances rather than to lose a sale or to go to the inconvenience of contacting the prescribing physician when it comes to the refill of prescriptions with narcotic content, either the cock-sure druggist leaves out the narcotic altogether or so reduces its amount that it can be sold as "Exempt."

Substitutions of therapeuticals that the pharmacist *"thinks"* contain *"almost"* the same ingredients as that asked for by the physician are much commoner than realized.

And, sorry the statement though none the less true, is the sadder sin of substituting cheaper or more convenient ingredients than those called for in the prescription.

Well has it been said that "Inattention to incompatabilities—frequently the cause of explosions while being compounded—has long been a bone of contention."

The richest, perhaps most justifiable counter-attack of the chemist, is as old as Hippocrates. Ancient tablets bear witness. This is of course that the physician does not know how to write legibly, or will not do so, merely for the sake of making the druggist work harder. Added to this is the indubitable fact that an illegibly written prescription is often carried around by the patient for some time prior to delivery to the pharmacy,—which of course does nothing at all to help matters.

Telephones have made contact with physicians such an easy matter that the pharmacist might well make such contact his personal message to

Garcia. If the doctor has used abbreviations that are too brief for precision,—let alone safety; if he has written out a compound for potent or poisonous drugs, in blurry pencil, or blotted ink, or undecipherable chirography, the conscientious pharmacist does by the physician what the physician did not do for him—he contacts and checks up.

Pharmacy is medicine's hand-maid. Without good pharmacy medicine sings a sorry tale. Instead of contention between the two there should be consultation and resultant confidence and co-operation.

THROWING OUT THE DOCTOR IN FAVOR OF THE PHYSICAL EDUCATOR IS POOR SCHOOL HEALTH SERVICE

Another rabid instance of the tail wagging the dog comes to sight in the tendency to permit the so-called "physical educators" of the school systems to take precedence over members of the medical profession in the direction and, indeed, in the very *absolutism* of what is what in the matter of supervision of the health of school children.

Too much emphasis cannot be placed upon the need for medical decision to be held superior to physical direction. Physical activity when well planned is a splendid unit in the development of the child. But the program must be cut to fit the individual child rather than that the individual child shall be cut to fit the program. Nutrition, rest and other contributory factors may often mean more to a child's physical well-being than any amount of exercise. As to a child's capacity to meet the requirements of the physical director no one is qualified to pass except a regular, practicing physician and to make such a member of the medical profession secondary to lay athletes partakes of the nature of legalized mayhem.

Dangerous physical conditions are often obscure. Only a licensed medical man, and sometimes not he, can discover these conditions which may be aggravated by the lay prescribed physical program for a normal, healthy child. Physical educators throughout the national educational system are endeavoring now to discard the doctor or at the most to make him their subordinate. It is well for doctor and dentist to realize that the value and the future of school health service is about to be removed from their jurisdiction. In this connection it may be well to quote from a recent article in the *"School Physicians Bulletin."* In part this article said:

"A State Civil Service examination was held recently for the position of a Director of the Division of Health and Physical Education in a State Department. Several physicians and physical educators took the examination. Among the physicians were two of national reputation for their years of success in the work. Among the physical educators was a young man who last year received his Ph. D. from a well known institution. The examination was conducted by a professor of physical education in the institution from which the physical educator received his Ph. D. and in whose classes he took his work.

"In the Foreword of his Thesis on which he was given his Ph. D., he gave his former teacher as is *Sponsor.*

"The ratings reported on the examinations were as follows:

"1—Physical Educator

"2—Physician

"3—Physician

"4—Physician

"The appointing power rejected No. 2 because of his age, though a leader for many years in school medical inspection, physical education and health education.

"No. 3 was rejected because she was a woman. This candidate presented far less qualifications than did Nos. 2 and 4.

"No. 4, though outstanding in the field for his achievements, was demoted in rank, which prevented his appointment.

"It was well known before the ratings were announced that numbers two and three would not be appointed for the reasons above given.

"It was necessary to appoint one of the first three, two of whom were eliminated by the appointing power in advance of the ratings.

"This left the former student of the conductor of the examination the only available candidate.

"Was it fair or unfair for his former teacher and sponsor to rate his qualifications above those of No. 4 and to set up a list with two known eliminations, that a physical educator might be appointed?"

THE SUN NEVER RESTS UPON COMMUNISTIC LAW MAKING FOR AMERICAN RIGHTS BREAKING

The law-making season is at hand again. It behooves the medical profession everywhere to keep an unusually vigilant eye upon the proceedings in state and federal halls of legislation. *Communists never let up.* Remember that one of the worst rods in pickle served up to the medical profession in a long time is the comparatively recent "Epstein Bill" or "Byrne Bill" or "Health Insurance Law" which the State of New York found on its doorstep. Laid there while the doctors slept.

The anonymous fathers of the imposition were, in the main, representatives of "Trust Foundations," "Endowments" and other socialistic boulevardiers making all possible trouble for the laws of human rights and decency and self-respect. One of the brightest points of the scheme was that the levy for this measure would be made on an employer-employe basis, with the starting point salaries or wages of $3,000 per annum, and the levy on either employer or employe to be so divided that a total of *four and one-half per cent.* (4.5%) *would come from them,* while from state funds would come one and one-half per cent. or (1.5%). State funds also come from employers and employees.

Even an astigmatic eye can detect the joker there without much trouble. Our old friend "double taxation."

Quoting further comments made in various media as to this neat bludgeon against the rights and privileges of American science and American democracy it is observed that "This law planned to allow disability insurance for the worker up to 26 weeks, to him and all his dependents, regardless of the relationship, free medical, dental, nursing, laboratory, and x-ray services together with free hospitalization, and prenatal and maternity care; the last to include disability insurance for the expectant mother *if she too were employed.* The total collected premiums for this insurance *would amount to 6 per cent. of the employee's salary in every instance;* and since figures were advanced that the average annual income in the state of the group included in the bill was $1,400, it therefore followed that at 6 per cent. the average sum per insured would be $84. From this meager stipend would easily have been taken at least two-thirds for administrative expenses and lay salaries, leaving about $28 per year for disability benefits for the insured up to 26 weeks, and medical, dental, nursing, pharmaceutical, laboratory, and hospital expenses for him and his entire family and dependents, in which the average family of dependents would certainly have been at least four; at that rate there would have been a per capita allotment of $7 per person. If this latter sum had been divided equally there would have been the magnificent amount of one dollar for health and sickness disability, one dollar for dental services, one dollar for drugs and sundries, one dollar for nursing, one dollar for laboratory and x-rays, and one dollar for hospitalization per year with nothing left over for prenatal and maternity care."

Again in the Department of Economics *Medical Times,* edited by Thomas A. McGoldrick, M. D., it is stated in further comment upon this and other socialistic legislation that this "Epstein Bill" or "Byrne Bill" provided that "a *Director of Health Insurance* shall be appointed at a salary of $10,000 per year. Also a Health Insurance Board of three members at $7,500 per annum; a nice, easy start for soft jobs and treasury raiding which would soon have eaten up the $84 which the poor, deluded, insured employee contributed, and he would have contributed the whole amount regardless of the apparent division of the premium. First, he contributed his share from his salary; next, the employer added his percentage to his operating expenses so that when the employee purchased goods he would pay the additional cost included in the article; and, last, the state contributed 1.5% from the general tax fund; and since the employee was also a taxpayer he paid his proportion of the burden. From the standpoint of economics the whole scheme was simply a subterfuge for grabbing $84 from the employee and using it for the purpose of creating a lot of fat sinecures."

THE 1937 ANNUAL MEETING

The 1937 Annual Meeting of the Illinois State Medical Society will be held in Peoria on May 18, 19, 20, and from the efforts of the host

Society, the Committee on Arrangements, Section Officers, and the officers of the State Medical Society, it seems quite logical to believe that the 1937 meeting will be one of the largest in attendance in the history of the Society.

Members who expect to attend the annual meeting should arrange at once for suitable hotel accommodations in Peoria, and Dr. W. A. Malcolm, Chairman of the Hotel Committee, will be pleased to make reservations for anyone asking for same. All meetings will be held in the Pere Marquette Hotel, the official hotel for the meeting. All exhibits, technical and scientific, will also be displayed in this building.

The officers of the scientific sections of the State Medical Society are arranging programs for their respective sections which will appeal to all members. The meeting will begin on Tuesday morning, May 18, with special meetings of Pediatricians, Obstetricians and Gynecologists, and the annual conference of secretaries of the county medical societies. Registration for the meeting will begin at 8:00 a. m. Tuesday, and it is necessary that all members and guests register before attending any sessions.

The Peoria Medical Society, acting as official host for the meeting, has been working for months to have everything arranged for a highly successful meeting, and having been host for many previous meetings, this society is anxious to see the largest attendance present this year that has ever assembled for a down-state meeting.

The preliminary program for the meeting will be published in the April ILLINOIS MEDICAL JOURNAL, and the official program will appear in the May *Journal*, giving much information concerning the meeting.

The House of Delegates will have two meetings, one on Tuesday afternoon, May 18, and the second on Thursday morning, May 20. Every county medical society in Illinois is entitled to representation in the House of Delegates, and it is hoped that each society will select a delegate who will attend the meeting and participate in the deliberations at each session.

Complete details and the preliminary program will appear in this *Journal* next month, and every member of the Society should begin now to plan to be present at the 1937 ANNUAL MEETING.

THE NATIONAL CANCER CAMPAIGN

As the various menaces to man's health and happiness reach a stage where a frontal attack on them is possible a mobilization of our resources against them is inevitable.

Tuberculosis, blindness, maternal health, child welfare, crippled children, The American Red Cross are names or phrases which offer a welcome challenge to public spirited and sympathetic men and women all over the United States.

With the appearance of each new organization comes more need for self-sacrifice and public service. It would require superhuman qualities not to feel a little worry as the number of appeals continues to mount. In spite of this fact, however, mature thought and consideration has shown that in every instance the need is urgent and very real and that the new organization is well qualified to meet it.

The most recent group to mobilize its strength against a great and cruel scourge is the Women's Field Army of the American Society for the Control of Cancer. This nationwide organization of the women of America will conduct a steady and relentless war to save, not to take human life. It is the kind of happy, wholesome fight against fear and ignorance in which everyone can and should willingly take part.

The enemy is a cold and subtle killer which last year took more than 140,000 lives in the United States alone. It has been estimated that there are between three and five hundred thousand sufferers from this disease alive today. Perhaps half of them might be saved if knowledge of the signs and symptoms which might mean early cancer were given to them and if they were also strengthened by courage to act on that information without delay.

To the millions of our people whose relatives and friends have borne the cross of cancer the call to arms will come as a welcome and long awaited summons. There will be a real and lasting satisfaction in enlisting as a soldier in a great fight. Cancer is no respecter of class, race, or creed. To combat it is a common task which will recognize no preference. It is a truly unifying and democratic undertaking which should mean all the more in the midst of a civilization torn with undemocratic claims for selfish rewards.

The fight will last long and will require both courage and patience. It must be a matter of

personal responsibility undertaken willingly in memory of those who have suffered and for the protection of the hundreds of thousands who need no longer do so. No one is so busy that he can afford to neglect his part in the united effort to check the silent inroads of a cruel killer.

When in March the first enlistment campaign is conducted there will be hundreds of thousands who flock eagerly to the symbol of the drawn sword and who will gladly do their part to bring light and peace where the darkness of ignorance and the sorrow of fear now are found.

STATE MEDICINE DOSES THE WELL AT THE EXPENSE OF THE SICK

Sickness is often an economic problem rather than pathologic. Sickness insurance is a form of deadly infection which creates a constantly increasing amount of illness and emasculates the individual by depriving him of his courage, sense of responsibility and manhood. He becomes fundamentally a chronic and demoralized invalid.

In England fourteen out of one hundred claimed sickness benefits in 1921 and this grew to twenty-three in 1927. With unmarried women the proportion grew from twelve to twenty-one and for married women from nineteen to thirty-eight out of each hundred applicants.

According to estimates, from 60% to 75% of those who come for medical attention are in no need of it. If told so they are displeased and flock to quacks who must be paid for their services. In only five of nineteen countries having National insurance were the patients satisfied with the service.

HAZARD OF CARBON TETRACHLORIDE IN THE REMOVAL OF ADHESIVE TAPE

Dr. Fredmont A. Chandler of Chicago in the *Journal A. M. A.* gives a report of a near fatal case following its use, we quote as follows:

In view of the aroused interest in adhesive solvents since the recent tragic accident in midwestern university training camp in which two lives were lost, there is danger of exchanging fire hazards for less familiar asphyxiative ones. Benzine or similar products are inflammable and must be protected from open flames or sparks. These products are more efficient in the removal of adhesive tape and of desquamated epithelium. They are well tolerated by young patients. The potential danger of fire is probably only slightly greater than that present in the use of alcohol solutions which are on every dressing tray or cart.

On the other hand, carbon tetrachloride softens desquamating skin only slightly. Its odor is offensive to children who have had recent anesthetics.

Carbon tetrachloride and similar chemicals have definite and dangerous anesthetic properties. A recent issue of *Time* describes the use of carbon tetrachloride as a means of killing foxes so as not to injure their pelts. The vapor is heavy, a feature enhancing its use in a fire extinguisher. Its use by some otolaryngologists in irrigating the external auditory meatus is to be condemned because of the possibility of leakage in the pharynx by way of the eustachian tube.

Dr. Chandler reports the following case to show that the free circulation of air in a large, open ward is not sufficient to eliminate the anesthetic properties of carbon tetrachloride under certain conditions:

C. P., a white girl, aged 4 years, had tuberculous spondylitis of the third and fourth and the seventh and eighth dorsal vertebrae of eighteen months' duration. A spine fusion operation to immobolize the diseased area of the spine was performed without any shocking effect on the patient. Convalescence was highly satisfactory. Solid food was tolerated within twelve hours. The operative dressings, which were held in place by adhesive tape, were changed on the fourth day by the intern. While he was removing the dressings, the child was prone. Carbon tetrachloride, which had been substituted for benzine by the hospital authorities because of the potential fire hazard, was used as a solvent to facilitate the removal of the dressings. The patient collapsed suddenly, respirations ceased and the radical pulse became impalpable. Death appeared imminent. Artificial respiration was instituted. In about five minutes the pulse returned, as did active respiration, at first feebly, and then stronger. In about ten minutes the child was quite normal. The subsequent convalescence has been uneventful. This case is reported as a warning against the indiscriminate use of carbon tetrachloride in the removal of

dressings from the upper part of the body, head and neck.

The presentation of carbon tetrachloride solutions and allied substances as safe solvents for the removal of adhesive tape under certain circumstances must be questioned. The layman is probably more familiar with the dangers of inflammatory mixtures than with those of heavy vapors possessing toxic potentialities.

6 North Michigan Avenue.

POSTGRADUATE COURSES

The Illinois State Medical Society is vitally interested in the activities going forward under the authority of the Social Security Act. The Act encompasses many fields in which medicine is directly or indirectly concerned and one of these fields is associated with the Maternal and Child Welfare clause. In this section Federal moneys are allotted to the States "to extend and strengthen services for mothers and children in rural areas, in areas suffering from severe economic distress and among groups in special need." Since 1929 rural infant mortality rates have exceeded urban rates—the reverse of prior years. From 1933 to 1934 the rural infant death rate increased from 59 to 62 per 1,000 live births and the urban death rate increased from 57 to 58.

In an effort to improve maternal and child welfare in this State, the Society is cooperating with three other organizations, namely, the State Department of Public Health, Illinois Academy of Pediatrics and the American Committee on Maternal Welfare, Inc., in bringing postgraduate courses in obstetrics and pediatrics to the County Medical Societies. These programs are of a clinical and scientific nature and will embrace a wide variety of problems encountered by physicians in general practice. The speakers are men well qualified in these two fields of medicine.

The general procedure is to offer a series of five or six programs at weekly intervals. The meetings will begin at 4:30 p. m. and a paper on obstetrics and one on pediatrics will be presented. Dinner will follow at 6:30 and in the evening starting at 7:30, two more papers will be given. Ample time will be had for discussion. Clinical work will be offered also in the earlier part of the day when there is a desire for it. On the same day of the following week two different speakers will present entirely different topics.

The manner in which these meetings will be held will, of course, vary with wishes of the individual Society, the general plan being to adopt the proceeding which will be of the most interest to the greatest number.

Dr. Harold H. Hill of the Department of Obstetrics and Gynecology of the University of Illinois is the Field Consultant in this educational work. He will make the appropriate arrangements for the series and in general coordinate the activities of the four participating organizations.

Present plans call for programs to begin in March and conclude in May as nothing will be offered in the summer, unless there is special demand by some country or group of counties. They will be resumed in September.

The Society believes the physicians of the State will welcome this opportunity to receive this graduate work in their local communities and hopes that full advantage will be taken of it.

The State Council has given its stamp of approval to this work and has designated the Educational Committee as the medium through which the work in the State is to be co-ordinated. Twenty-four programs have already been scheduled for March, April and May, while next fall and winter the programs will be in full swing.

TREATMENT OF ORGANIC ARTERIAL OBSTRUCTION BY ALTERNATING SUCTION AND PRESSURE: DEVICE TO RELIEVE INCIDENTAL ARTERIOSPASM

Edward Allen Edwards, Boston (*Journal A. M. A.*, Feb. 20, 1937), declares that in cases of both acute and chronic organic arterial obstruction there is apt to be an associated spasm of the collateral vessels. This spasm counteracts the effect of the suction-pressure therapy and is not relieved by the treatment. He describes a device that furnishes warmth to the affected extremity while it is treated by suction-pressure. Such locally applied warmth is capable of maximal vasodilatation and increases the effectiveness of the suction. Moreover, the local increase in metabolism caused by the raised temperature assist in the process of healing.

Eclampsia is accompanied by concentration of the blood. This may be detected by serial determinations of hemoglobin, cell volume, or serum protein. Clinical improvement parallels effective blood dilution. Glucose solution may be used for blood dilution, the amount to be given depending upon the degree of blood concentration. Dieckmann, W. J., *Am. J. Obst. & Gynec.* 32:927, 1936.

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During the last month the problem of medical care of those farmers, who are clients of the Federal Resettlement Administration has been brought to the attention of organized medicine in Illinois as well as the contiguous states. The number of farmers who are receiving aid from the federal government is not definitely known, but it is much greater than most medical men had believed at least here in Illinois. Unfortunately, definite statistics were not available by the representatives of the Administrations, with whom the conferences were held. According to these representatives, the number in Illinois was around 5,000, distributed through the southern two thirds of the state with only an occasional client in the northern third. Without much question the recent flood in southern Illinois will increased the number of so-called clients. To become a client of the Federal Resettlement Administration, a farmer must have derived his last income from farming and in the opinion of the local representative be capable of the work. Then if he cannot borrow money from any place else, the Resettlement Administration after investigation by a local council will loan him the money to set up farming and in addition will loan him enough money to live the first year. The client will sign notes for the amount of the money borrowed. The representatives of the Administration are endeavoring to make some arrangement whereby their clients can be assured of adequate medical care at a price they feel their clients can afford. Accordingly through their Regional Director, Mr. Hays of Indianapolis and Dr. Williams, Medical Director, on detached duty from the U. S. Public Health Service, they are contacting the state medical societies of the Middle West in an effort to work out some plan for uniformity. At the first meeting with these men, the Chairman of this Committee was present and tried to see the problem from the side of both the medical profession and the government. At a subsequent meeting held in Chicago, February 14, the day the Northwest Regional Conference was in session, representatives of five states met and talked over the problem. The Chairman of this Committee was not present at that meeting. That same evening a special meeting of the Council of the Illinois State Medical Society was held to consider the problem. In addition to the Council, Dr. Woodward, Director of the Bureau of Legal Medicine and Legislation of the AMA; Mr. Hays; Dr. Williams and Mr. Carmichael, State Director for Illinois, were present. After considerable discussion, the problem was referred to a special Committee under the Chairmanship of Dr. John Neal of Springfield to study them and report at the next regular meeting of the Council.

Many interesting questions came up during the discussion. It was admitted by the representatives of the Administration that to the best of their knowledge their clients had been receiving adequate medical care and there had been no discriminaton against them by the medical profession on account of their lack of funds to pay the doctors. However, they felt that some scaling of the fee schedule for their clients would result in more income to the doctors, because the administration would insist that the additional money loaned their clients, on account of sickness, being paid to the doctors. The exact method by which this was to be accomplished was under discussion. Aside from the plan in use in the Dakotas and that of Oklahoma, there was no concrete example of the way it might be handled. On account of the large percentage of farmers on relief in the Dakotas, a special plan had been set up there. It was generally admitted by the representatives of the Administration that such a plan would not be advisable in Illinois. The Oklahoma plan would work, but the Administration would prefer another plan, which had some of the features of prepayment insurance. This, of course, was not agreeable to the medical profession.

Another outstanding feature was the lack of

uniformity as to the number of clients in Illinois and their distribution by counties. Each man talked to had a different idea as to which counties contained the most clients and none of them could or would give the exact number in each county. In some counties there was doubt as to the accuracy of some of the figures given by the state Director, Mr. Carmichael.

One left the meeting wondering just how great was the demand for action in this work and somewhat perturbed at the apparent lack of definite information on the part of those representatives of the administration who were present. It is to be hoped that the Committee under Dr. Neal will investigate the accuracy of the figures when and if he receives the same from the officials. The officers of each county society should cooperate with Dr. Neal and see if the so-called clients in his county are actually entitled to relief and if they are, whether some other agency of government has been supplying the relief. Overlapping of relief has occurred in the past and in view of the admission of the Administration that their clients have not been neglected and the opinion of some of the doctors present that the figures stated were high, the possibility of overlapping should receive serious consideration.

The annual meeting of the Northwest Regional Conference was held at the Palmer House in Chicago on Sunday, February 14, 1937. The attendance was good, especially that of the officers of the Illinois State Medical Society and this Committee. The program was excellent and all those who attended came away with a keener realization of the economic problems of the medical profession. It is regrettable that the seriousness of this question has not as yet been realized by the rank and file of the medical profession. And they will be the ones who will be affected most by any changes and will naturally complain the loudest at that time. There is a great demand for speakers to lay audiences on the subject of state medicine and the supply is inadequate. There should be several men in every county society who have prepared themselves on the subject so that they can fill the requests for speakers.

The special article this month is an address of Dr. J. S. Templeton, President of the Southern Illinois Medical Association, delivered November 12, 1936. Careful reading of the same will be both instructive and stimulating.

E. S. HAMILTON, M. D.,
Chairman.

PRESIDENT'S ADDRESS

J. S. TEMPLETON, M. D.
PINCKNEYVILLE, ILL.

Ladies and Gentlemen, Members of the Medical Profession:

I want to thank you for the opportunity of directing the affairs of this Association the past year. We have tried a new method, that of having a one day session. This association has met every year excepting one for the last sixty-two and that one was during the world war. Just how much good has been accomplished cannot be estimated. However, we know the organization and its meetings have done worthy service for Southern Illinois and our inhabitants. Some good to others, of course.

I am proud to preside over this meeting in Murphysboro, a city that has an enviable reputation for harmony among the medical profession, for a devoted profession bending their energies to promote scientific medicine, working shoulder to shoulder to relieve the suffering and ills of humanity.

I am proud to belong to the Southern Illinois Medical Association. Within what other confines or territory will you find medical men of the rural districts who with but little effort may attend a meeting every Thursday evening between the months of September and June to study scientific medicine? Such is the privilege of those who belong to the five county organizations of our community.

These five counties are in the heart of Southern Illinois and physicians from other counties are always more than welcome. All that is necessary is to have their names put on our mailing list. We medical men of Southern Illinois are not trying to go alone. Each of the separate counties is proud to be a part of the Illinois State Society, one of the best State Societies in America, a Society that is progressive and much copied by other similar organizations. We have an Educational Committee second to none, a Committee on Medical Economics that ranks with the best, a Legislative and other committees that really deserve special mention.

Not content with these contacts, many of us belong to the American Medical Association, which, no doubt, is the greatest of its kind in the world.

Read before the Southern Illinois Medical Association, Nov. 12, 1936.

You may ask why all of these organizations. What is the objective? This question is easily answered. To learn and practice scientific medicine for the benefit of humanity. Not for our own personal benefit for we are here but for a short time, but scientific medicine will go on and on for countless centuries. Scientific medicine began in a feeble way before the time of Christ. Hippocrates dreamed of better days and the oath written by him and handed down from generation to generation is teachings we may yet emulate. At the time Christ was born into the world, man's conception of scientific medicine was very vague. Nor did he grasp the fundamentals of the Christian religion. Because of his ignorance he tried to combine religion and medicine and they both suffered degradation. Seeing this, governments undertook to take charge and the confusion became greater than ever. What was the result? Days so dark for humanity that history will always record the following centuries as the dark ages. For more than a thousand years scientific medicine hung by a thread. It was in the clutch of ignorance and political control. To us who were born in a more enlightened age, this seems impossible, yet it is true. Witchcraft, superstition and ignorance prevailed to such an extent in the old world that when the colonists settled what is now our United States these things continued and thrived for a time. Among the many plagues that were so baffling to medical men of the 17th, 18th and early part of the 19th centuries, was one with which we older men are all more or less familiar; namely, smallpox, which came into Europe during the tenth century. Because of the slowness of travel and communications, it was five centuries before it spread over the continent. It was no respecter of persons. Louis XV of France died of it, also Queen Mary of England who died in 1694. The Queen was 33 at the time of her death. In the century following her death, sixty million persons in Europe died of smallpox—more than half a million a year.

Shortly before the Mayflower landed in America, smallpox had come up through Mexico and infested the Indians and it is said half of those inhabiting the Eastern Coast of America died within a few years.

Among the colonists, Boston was the most seriously afflicted with smallpox. Eleven thousand or one-half the population were stricken in one year.

Asiatic cholera invaded New York City in 1832 and in eight years there were about 4,500 deaths in the city. In the two decades following there were 9,000 deaths from cholera alone. Before another epidemic struck the city, sanitation and scientific medicine had been so developed it caused but few deaths and little terror.

Yellow fever prevented the French from building a canal across the Isthmus of Panama. So great was the mortality from the disease during their work there that it is said there is a Frenchman buried under every tie of the Panama Railway. General Gorgas applied scientific medical ideas to its sanitation and now it is the healthiest spot in the world.

Jenner's application of science to medical practice gave us vaccination and relieved us of all fear or danger of smallpox. But for ignorance and negligence the world need never have another case of this loathsome disease. Proper sanitation and application of medical science has relieved America of all dangers of cholera.

The mastery of these plagues is a small part of the victories of scientific medicine; what a difference it makes on our way of living in this old world today. Surgery, anesthesia, sanitation, vaccination, and more than a hundred other things are the result of the application of medical science in the hands of the medical profession, none of which have been brought about by government control of medicine.

For more than a century and a half medicine in the United States has been master of its home house. More progress has been made during these years than in any five centuries, or in fact, in all history of mankind. Some of us well remember when we began using antitoxin for diphtheria, how families of afflicted children were cured as if by magic.

Typhoid of today is fast vanishing. Who of you have in the last twenty years heard a paper on how to treat typhoid fever? We so seldom see a case, we know there is little to interest the profession. While we give of our best of scientific medicine in the treatment, we realize it is scientific sanitation and vaccination that prevent others from becoming infected and cut the death rate. A few more years of vaccination against typhoid and proper sanitation, and it, like Asiatic cholera, yellow fever and smallpox, will be eradicated.

The accomplishments of scientific medicine during the last century have been so great that

every man living today who has studied and practiced this science has every reason to be proud. Mankind, especially of North America, should rejoice with us.

The next question is, do they? We answer yes; some of them do. The mother with her sweet, innocent, cooing babe in her arms, or in its crib, thinks of all that might happen to that child. Diphtheria? No. Our family physician will take care of that; he will vaccinate and our loved one will never have it. Smallpox? No. Epidemics of that rage no more, and vaccination will prevent that also.

I could continue naming one thing after another that crosses the mother's mind, and every time she consoles herself that we have a family physician with a kind heart, a keen intellect and a willing disposition to serve, ready at all times to apply his knowledge of scientific medicine. What a consolation. What a relief; and it is shared by every member of the family. It is not the rich, common or poor people that want a change. They want to have their own family physician and pay him.

It is the communist and the politician. The communist seeks a chance to bring his ideas before the common people and he flatters and cajoles the politician, leads him to believe that what he has to offer will please everybody. And it often does please too many. Communism is the embodiment of regimentation, versus individualism. Individualism has been the shining star of all progress in medicine. Hippocrates, working alone and individually, accomplished much. A long line of individuals, Aesculapius, Paré, William Hunter, Oliver Wendell Holmes, Semmelweis, Simpson and many other men known for their individual ideas and character served well this old world. Where would medicine be today if it had not been for the lives and accomplishments of these great individualists? What has regimentation done for us? Study the history of the world and you will find that countries that try to regiment and deprive their citizens of individual rights are soon on the road to destruction. We have the politicians to contend with. Every President we have ever had was a politcian. Every representative and senator is a politician. Everyone is to some extent listening to the designing communist who has brought nation after nation to its ruins. There is a wave of communism traveling westward through Europe and it has already made its presence felt in our beloved United States. Organized medicine may well beware of its future, great as are its achievements of the past. No doubt the Romans of the Golden Age thought that their civilization was stable, yet within a few centuries it passed into the degradation of the Middle Ages. The danger to the scientific spirit, to the advance of medicine and to the integrity of civilization, does not come from the mass of unthinking people. This danger comes from intelligent people who play a part in shaping civilization, but who have not been trained to think rationally. It comes from sentimental and idle people in whom the primitive instinct escapes from repression and rises to prevent thought. We have an example in the life of Napoleon Bonaparte, one of the greatest men of history. He led his people to believe they were fighting for a great cause, that they were offering their lives for their beloved country, when in realty they were dying to satisfy his lust for power, his ambition to rule not only his own country but all the near nations of Europe. Frederick the Great said: "No man has the right to allow himself unlimited sway over his fellow men. Only the tyranny of government brings the people to rebellion."

With these plain, undeniable facts before us, may we not in some way arrest the progress of communistic interference with the practice of medicine? I say progress because we have the first requisites for the regimentation of medicine. The Social Security Act is now law and we have an administration more than willing to put it into effect. I know little of other policies promulgated in the Social Security Act, but I do know that the medical part, if put into effect, will degrade the profession. It will interfere with the progress of scientific medicine. Citizens of the lower walks of life will suffer and medical care will be far more unevenly distributed. A poor man will not be able to pay his taxes and hire a family physician as he does today.

The medical sciences are today giving the world the healthiest period it has ever known, but they are not yet mature. What has already been accomplished in scientific medicine is small in comparison with future possibilities of preventing disease, alleviating suffering and prolonging human life. What shall we do? Sit idly by and shirk our obligation or go on like men and oppose the enactment of laws detrimental to scientific medicine? Do not say there is nothing

we can do. Occasionally I hear some one criticizing our State Medical Society for not doing more. Now is the time each individual can do something; individually take hold. You will have plenty of help. See that your County Medical Society sends a resolution to each of your Representatives in Congress and Senators, as well. Ask them to vote to repeal that part of the Social Security Act that pertains to the practice of medicine. If there must be something in that Act, let them confer with medical men who believe in and practice scientific medicine.

If the medical profession does not know what is best for the care of our sick, and how it should be distributed, our lives are a failure and we should not be allowed to practice medicine.

EDUCATIONAL COMMITTEE

Report for January and February, 1937

SPEAKERS BUREAU

Eighty-three doctors were scheduled to address lay organizations in 12 different counties of the state.

"Extraordinarily interesting and beneficial."

"His excellent talk was received with enthusiasm."

"Fine lecture. Appeals to the audience."

"Excellent. Never had anyone give so much interesting information in so short a time."

"Lecture well given and well received."

Material was furnished to clubs where the attendance did not warrant a speaker. Radio talks given by members of the Illinois State Medical Society are being used as study material by many of these smaller groups.

Women's clubs, men's clubs, parent teacher associations are asking for programs on syphilis. As soon as a large enough list of speakers is available, programs on this subject will be offered high schools in the state.

The Committee finds that the subject of STATE MEDICINE is of interest to lay organizations. Almost every week talks are given on this topic.

Series of programs have been arranged for a fraternity of the Chicago Medical School, one a month for five months.

Chicago Y. M. C. A.s are making considerable use of the Speakers' Bureau and the following have had semi-weekly, weekly or monthly programs:

Lawson Y. M. C. A.
Central Y. M. C. A.
Sears Roebuck Y. M. C. A.
Wilson Avenue Y. M. C. A.
Y. M. C. A. Hotel.

RADIO PROGRAMS

37 popular health talks were given over WBBM, WGN, WJJD and WAAF.

It is very difficult to find enough speakers for these radio talks and the Committee does not wish to have to depend on just a few men to give these programs. An attempt is made to have the programs varied by round-table discussions, questions and answers. These radio talks are one thing which we must keep going for the stations give us the periods free of charge and they depend upon us to see that the speakers are there with something interesting to give the listening public.

EXHIBITS

Exhibits of health material have been secured for the Illinois Federation of Women's Clubs (Syphilis), Wilson Avenue Y. M. C. A. (Quackery), Central Y. M. C. A. (Popular Health Questions), the Sangamon County Medical Society (Cancer), and Marshall Field & Co. Annex Building.

The January window at Fields consisted of modeled figures of medical leaders (anesthesia and aseptic surgery) secured from the American Medical Ass'n.

The February window at Fields displayed a beautiful heart model loaned by Mr. Tom Jones of the University of Illinois and heart charts loaned by Dr. Robert S. Berghoff.

COOPERATION OTHER ORGANIZATIONS

The Vocational Guidance Panel sponsored by the Chicago Chamber of Commerce, the Chicago Rotary Club and North Park College proved to be a huge success. Dr. Foley, President of the Chicago Medical Society, made the final arrangements for this discussion on opportunities in medicine and the tour of Cook County Hospital which followed. About 60 young men students of North Park College were privileged to participate in this excellent program.

Copies of the booklet outlining the method of procedure for the SUMMER ROUND-UP campaign sponsored by the Illinois Congress of Parents and Teachers were sent to officers of all county medical societies. Contacts were made for the Parent Teacher Officers with a number of medical societies.

Material has been furnished all the Home Bureau Advisers of the State at the request of the Extension Department of the University of Illinois. Suitable material is sent every month.

Study material was supplied the American Red Cross.

The secretary has given cooperation to the Woman's Field Army of the American Society for the Control of Cancer, has met with the Illinois chairman, furnished information, names, and speakers when called upon. The radio talks sponsored by the Committee during the two middle weeks of March will be devoted to the subject of CANCER.

SCIENTIFIC SERVICE COMMITTEE

40 scientific programs were secured for 20 county medical societies—two of the programs were for Scott County in Iowa.

NEWSPAPER SERVICE

I heart clinic was arranged for La Salle County Medical Society.

Late in January a special article on PNEUMONIA, written in different style from our other material, was sent to 447 newspapers in Illinois. These were papers not using a regular health column from the Illinois State Medical Society. A card was enclosed which editors could return indicating their desire to receive similar articles every week—some for release over the authority of the local county medical society. As a result of this venture

86 editors requested weekly articles and during the month of February they were sent material on *Syphilis, Socialized Medicine, Whooping Cough, Scarlet Fever.*

40 health articles were sent to 20 papers using articles once a month.

704 releases to downstate newspapers.

159 releases to Chicago and vicinity.

1,104 health articles to downstate libraries and home advisers.

384 health articles to Chicago branch libraries.

PUBLICITY FOR CHICAGO MEDICAL SOCIETY

34 releases to Chicago papers re Chicago Medical meetings.

81 releases re North Side Branch meeting.

10 releases re Englewood Branch meeting.

8 releases re North Shore Branch meeting.

RELEASES TO NEWSPAPERS ABOUT MEDICAL SOCIETY MEETINGS

109 releases for LaSalle County.

103 releases for DeWitt County.

25 releases for Randolph County.

13 releases for Henry County.

55 releases for Bureau County.

48 releases for Whiteside County.

27 releases for Jefferson-Hamilton.

SERVICE TO COUNTY MEDICAL SOCIETIES

600 notices prepared for LaSalle County.

176 notices prepared for Henry County.

145 notices prepared for Randolph County.

135 notices prepared for Perry County.

174 notices prepared for Whiteside County.

122 notices prepared for Franklin County.

96 notices prepared for Bureau County.

94 notices prepared for Effingham County.

87 notices prepared for Jefferson-Hamilton County.

REFRESHER COURSES IN OBSTETRICS AND PEDIATRICS

Through the office of the Educational Committee contact was made with county medical societies for Doctor Harold K. Hill. The following county societies are planning to sponsor the refresher courses and meetings will be held weekly with programs being given in the late afternoon and evening:

McLean
Sangamon
DeWitt
Logan
Menard
Mason
Fulton
McDonough

A total of 58 speakers have been secured to present the programs for these societies—all of which will be given between March 4th and May 25th.

Publicity has been given the first program in DeWitt-Logan Counties.

Outlines for the speakers, as submitted by Dr. Hill and his Committee, have been mimeographed and mailed. The plan is to furnish outlines to all men attending the courses so that they may have them for notes and reference.

Mimeographed copies of the county programs have been made for the secretaries to use in their publicity.

Respectfully submitted,

JEAN MCARTHUR, Secretary.

ORGANIZATION ACTIVITIES OF THE WOMAN'S AUXILIARY

In keeping with the promotion of increased membership for the year, the President of the Auxiliary to the Illinois State Medical Society, requested this item be written.

This phase of Auxiliary work is indeed a very interesting one, and while it entails much hard and persuasive endeavor, it is most interesting There can be no doubt but that education plays the biggest part in the promotion of an Auxiliary, in fact it seems to be the first step. We must thoroughly understand the purposes and aims, become imbued with the idea, and then we may pass this knowledge on to others.

We should eradicate the prevailing idea that an Auxiliary is just another social organization, for it is far from being one. A medical Auxiliary is simply what the word "Auxiliary" implies, a help or aid; in reality it is the Public Relations Committee for the medical society, and as such it has many opportunities to contact the laity, through the many and various clubs and lay organizations to which the doctor's wife belongs.

One must take in consideration when endeavoring to form an Auxiliary the desire on the part of the wives for such an organization. A thorough discussion of every phase of the Auxiliary is advisable, stressing the importance of its various functions, and its field of usefulness. It is well to note that an Auxiliary is found both in large and small communities, and it has been definitely established that where an Auxiliary exists, that that particular Medical Society is wide awake, and we may say a modern one.

As you no doubt know, we must have the consent of the County Medical Society before an Auxiliary may be organized. If the advantages of the Auxiliary are made clear to the physicians, very little objection is voiced against the formation of such an organization. Naturally the medical profession welcomes a helping hand in these days, especially when that help can reach out into the lay world. Not only can information concerning common medical problems be passed on, but the Auxiliary is a help in legislative matters affecting the profession. One proof of an advantage of an organized group of wives of doctors, is that it has been demonstrated as an Auxiliary much may be accomplished, where as an individual, one is simply lost in the swirl.

But one of the greatest advantages of an Auxiliary is to be found in the bringing together of doctor's wives in closer contact with each other, forming new acquaintances, and in many instances cementing lasting friendships.

To belong to an Auxiliary is to me a very happy privilege, in that I am doing my duty in some small

way to further a better understanding of the problems of the modern physician.

Mrs. Herbert B. Henkel,
Illinois State Organization Chairman.

AUXILIARY APPRECIATION

To LaSalle County Woman's Auxiliary we extend a hearty welcome. We feel that our pleasure in having a newly organized unit added to our list is small compared to the pleasure in store for this new group of Auxiliary women in working out the State program. Mrs. Raymond E. Davies, Councilor for the Second District, and members of Bureau County, are to be congratulated. The good efforts of Mrs. H. B. Henkel, Chairman of Organization, were another factor in the success of the undertaking.

The new officers are:

President, Mrs. A. I. Raminofsky, LaSalle, Ill.

Vice-President, Mrs. Geo. Guibor, Ottawa, Ill.

Secretary-Treasurer, Mrs. J. S. Terrando, LaSalle, Ill.

Historian, Mrs. V. Vighi, Ottawa, Ill.

Program & Public Relations, Mrs. J. DeVries, Marseilles, Ill.

Membership, Mrs. E. P. Twohey, Ottawa, Ill., and Mrs. J. W. Geiger, LaSalle, Ill.

Hygeia, Mrs. L. Christian, Ottawa, Ill.

We wish them success and happiness in their new duties.

Mrs. V. M. Seron, Chairman,
Press and Publicity.

INTERNATIONAL CONFERENCE ON FEVER THERAPY

In conjunction with the International Conference on Fever Therapy to be held at the Waldorf-Astoria Hotel on March 29th, 30th, 31, 1937, there will be a scientific and commercial exhibit staged.

The clinics will be held at the College of Physicians and Surgeons, Columbia University, New York City.

A large attendance of fever therapists from all over the world is expected. A very interesting and instructive program has been arranged and all of those who plan to attend the conference are urged to register promptly with the general Secretary, Dr. William Bierman, 471 Park Avenue, New York City. The registration fee is $15.00.

Anyone desiring information in connection with the Military Surgeons 1937 convention to be held at Los Angeles, October 14 to 16, the American Association of Orthopedic Surgeons to be held at the Biltmore Hotel, Los Angeles, January 15 to 19, the American Association of Railway Surgeons meeting to be held September 21 to 22 at the Palmer House in Chicago, or the International Fever Therapy Conference, as above mentioned, should address Mr. Robert Lewin, 505 N. Michigan Ave., Chicago, Ill.

JOSLIN REPORT FAVORS GELATINE FOR MILK MODIFICATION

A study conducted by Dr. C. Loring Joslin, Department of Pediatrics, was made with a group of infants as they appeared at the clinic of the University of Maryland to determine any essential differences in milk and modified milk. The results are reported in a paper "Some Clinical Observations on Feeding Infants Whole Milk, Gelatinized Milk and Acidified Milk" published in the January, 1937, issue of the Archives of Pediatrics.

The group (150 infants) included not only normal feeding cases, but infants complaining of vomiting, constipation and other disorders relating to the digestive system. Any practicing physician would be confronted with similar cases.

All the infants received approximately the same amount of food including cod liver oil and orange juice. Fifty of them were fed ordinary cow's milk fifty acidified milk (three drops of lactic acid to one ounce of milk), and fifty infants received the gelatinized milk. One or two per cent. gelatine was added to the latter formula by first softening the gelatine in the water of formula which had been boiled and cooled. The gelatine was softened ten minutes before added to the milk of the formula.

The results of the study showed:

1. Infants fed gelatinized milk were less susceptible to infections, especially upper respiratory infections, than those fed acidified or cow's milk.
2. The occurrence of diarrhea was less frequent in the acidified milk group and the gelatinized milk group, than in the unaltered milk group.
3. The group of infants fed gelatinized milk had a better rate of gain than those fed acidified milk or plain cow's milk.
4. Vomiting and "appetite poor" symptoms among the infants were cured or showed improvement when fed gelatinized milk which contrasts remarkably to the feeding results of the other groups which showed little change.
5. The infants in the gelatinized milk group had more favorable results than the acidified milk group or cow's milk in relation to constipation.

Correspondence

Chicago, Ill., Feb. 22, 1937.

IN NO WAY CONNECTED WITH BENEFIT TICKET SALE

To the Editor: The Illinois State Nurses Association wishes to announce to the public that it is in no way connected with a benefit ticket sale conducted each spring for needy, sick or destitute nurses, nor do we know of any nurses receiving such aid.

The Illinois State Nurses Association has been incorporated in this state for 36 years. It represents 99½ per cent of the nursing schools of this state. It is the only official nurses association in Illinois recognized by the United States government.

Cordially yours,
Edna S. Newman, President
First District, Illinois
State Nurses Association

Original Articles

HIP FRACTURE TREATMENT BY THE ROGER ANDERSON TECHNIC

H. D. JUNKIN, M. D.,
PARIS, ILL.

Hip fracture has presented a major problem from the earliest periods of medical history. Kellogg Speed[1] terms the so-called intracapsular femoral fracture "The unsolved fracture." All of us agree that any advance in the care of these problems is not only welcome but indeed timely.

The literature is very rich in papers on hip fracture. From the application of the simple Buck's extension, the use of nails, pins and intricate internal fixation splintage with the autogenous bone peg as described by Albee;[2] each has found enthusiastic supporters. Perhaps the abduction method of Whitman established the basis for the advancement made in recent years. The fact remains that since so many methods have been suggested, it reflects the feeling of dissatisfaction by the profession in the results obtained in solving this problem. Certainly, many of us in the field of general surgery have not been entirely content with our results in hip fracture. The definite improvement in our service after adopting the Roger Anderson technique prompted this presentation.

A short description of the detail of the technique of applying this dressing will be given. You are referred to Roger Anderson's publication in the October issue of the American Journal of Surgery, 1933 for more detail.[3] Briefly, the patient is given either one-eighth or one-sixth of a grain of morphine with 1/200 grain of hyoscine before going to surgery. A $\frac{1}{16}$" Stineman pin is passed through the lower end of the tibia of fractured hip. Of course, strictest asepsis is practiced. A sterile sponge is now placed against the extremity on each side of the pin; the pin tranfixing the sponge near the center. Novocaine 1% in the soft tissues at site of insertion of the pin is all that is required in way of anesthesia. Stockinette is then applied from tip of toes to mid-thigh on both lower extremities. A light covering of sheet wadding is then applied and a felt pad over the plantar surfaces of both feet and well over the heels. Plaster is then applied, first to the well leg and then the injured extremity from tip of toes to mid-thigh. A window is cut over both patellae, the head of the fibulae and over the extensor surface of both feet. The splint is now attached first to the well leg cast and then to the pin of the injured extremity by means of a few turns of plaster bandage. After this has set, extension, internal or external rotation is effected by adjustment of the splint and reduction easily accomplished. We have modified the original technique in that the felt pad used over the plantar surface of the foot is extended over the heel and as high on the leg as the level of the malleoli. The malleoli are protected with felt so that no opening in the cast is cut over them. Both extremities are encased in plaster casts from toes to mid-thigh and after final reduction is obtained, a plaster bridge is built between the casts thus immobilizing the extremities firmly and assuring maintenance of extension even though the extension nut should be released after the patient returned home. Recently, at the suggestion of Roger Anderson,[4] we placed a Stineman pin through the upper end of the tibia of the well leg, incorporating it in the cast thereby taking most of the pressure off the plantar surfaces of the foot. This has added much to the comfort of the patient. The cast was extended to the toes as before as this support to the feet is desirable.

This report is based on one hundred (100) cases in which the Roger Anderson Well-Leg Splint was used. Thirty-eight were hip fractures and are the cases under discussion. The age of the patients ranged from 40 to 96. For clearness of description and with a desire to avoid confusion in classification, we shall divide our cases into fractures of the neck referring to the high fractures of the neck, and fractures of the trochanteric area. Fifteen of our cases were fractures of the neck and 23 involved the trochanteric area. All living past a year recovered with bony union and good function. Six deaths occurred or about 13%. Three deaths were due to pneumonia and all were females. One, aged 74, died two months after reduction; one, aged 87, died three weeks after reduction; and the third, 95 years, died during her second week following reduction. Two died of cerebral hemorrhage. Both were males. Each fell to the

Read before Section on Surgery, Illinois State Medical Society, 86th Annual Meeting, Springfield, May 19, 1936.

floor resulting in a fracture of the hip. One male, aged 79 years, died the second day. The other, a male, aged 92, died 36 hours after the injury. The sixth case, also a male, aged 63, died on his 36th day after injury. This case I will comment on more in detail later.

Most of our cases left the hospital at the end of a week. The casts were removed after twelve weeks. The trochanteric fractures were permitted to put some weight on the injured extremity on removal of the dressing. At the end of six months, full weight bearing was permitted. In the neck fractures, full weight was not permitted for one year. In one of our cases, Mr. E. P.. aged 63, who sustained a fracture of the trochanteric area in an automobile accident, an opportunity to examine the fractured area at the 36th post-reduction day was made possible at a post-mortem. The autopsy was conducted a year later by an insurance company in order to attempt to settle their liability. The fracture showed complete healing with perfect alignment of the fragments. This opportunity of observing the healing process suggested at once the possibility of shortening the morbidity of these cases; at least those involving the trochanteric area.

SUMMARY

1. Thirty-eight cases of fresh hip fracture are reported with six deaths. The cases which recovered all had bony union and excellent function.

2. The Anderson Well-Leg Splint affords a satisfactory procedure to effect and maintain reduction of hip fractures with the minimum discomfort and trauma to the patient.

3. The recovery of these patients certainly is favored by the fact that local anesthesia is adequate; immediate use of the wheel chair permits freedom of movement and change of position; the tranquility of home surroundings by the short period of hospitalization; and the use of physio-therapy which is so applicable with this set-up.

4. Mechanically, skeletal traction, abduction, and internal or external rotation is easily accomplished with this splint. And lastly, the technique is simple and practical for the average surgeon.

REFERENCES

1. Kellogg Speed: The Unsolved Fracture. Surg. Gyn. and Obst. 60: 341-352, 1935.

2. Fred H. Albee: Treatment of Fractures of the Neck of the Femur. J. of Florida Med. Assn. 18: 11-16, 1931.

3. Roger Anderson: The Well-Leg Counter Traction Method. The Amer. J. of Surg. New Series, 18: 36 to 50, 1932.

4. Personal communication.

FRACTURE OF THE NECK OF THE FEMUR TREATED BY THE STEEL PIN METHOD OF FIXATION

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Introduction. Of all fractures of the extremities of the skeleton, fracture of the femoral neck is the principal cause of disability and death. Our results are too often unsatisfactory and our prognosis always doubtful. It has been termed the unsolved fracture and demands attention and study more than any other bone injury at the present time. Prior to one hundred years ago it was believed that bony union never occurred in intracapsular fractures of the neck of the femur and Sir Astley Cooper recorded only one case in which he had seen good union result. In 1835 the number of anatomical specimens of bony union totaled less than forty in the whole world and grave doubts were expressed as to their authenticity. Now we know definitely that bony union does result in a certain percentage of cases but unfortunately the percentage is still rather small.

Anatomy. It is difficult to determine just why so many non-unions occur in the femoral neck. Speculation about interrupted blood supply and increased inorganic content of the bone has long held favor. Recent studies, however, have shown that usually there is a fair blood supply in the normal neck of the femur and that it probably enters from four different sources:

1. The periosteal vessels.
2. The ligamentum teres.
3. The branches of the cervical arteries.
4. The superior nutrient artery.

It is difficult to see how sufficient injury to all these blood supplies can be brought about by the small trauma necessary to fracture the bone. Also, it has been proven that the organic content of the bone is really increased in the aged, averaging about 42% as contrasted with 40%

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earlier in life. This apparently would make the bone less brittle rather than more brittle. We now fall back on the thinning of the bony walls and the increased cavitation of the canal openings to explain the high percentage of fractures but still this does not seem to explain the entire picture.

Early Methods. Treatment of this particular fracture has always been and still is rather unsatisfactory. Buck's extension was used almost

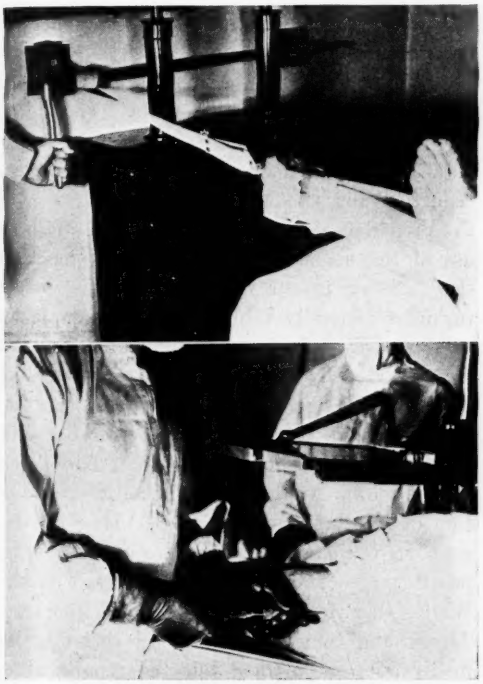

Fig. 1-A. Ratchet traction applied by Buck's extension. Canvas strap pelvic counter-traction.
Fig. 1-B. Insertion of pin. Direction and depth of penetration guided by fluoroscope.

universally for about one hundred years and according to reports less than 10% perfect results were obtained. In 1904 Whitman made the first forward step with his abduction and plaster fixation method. This was a tremendous advantage over the previous popular methods but even this has many drawbacks. About 95% of these fractures occur in aged people and they do not tolerate extensive, prolonged plaster fixation very well. The complications of pressure areas, pneumonia, resulting stiffness of the immobilized joints in addition to the hip joint and the rapid loss of weight which usually occurs, causing looseness of the cast, are undesirable features often encountered. In addition to these drawbacks advocates of this method who have followed their cases for more than two years and have large enough series to draw conclusions of value report from 40% to 60% non-unions.

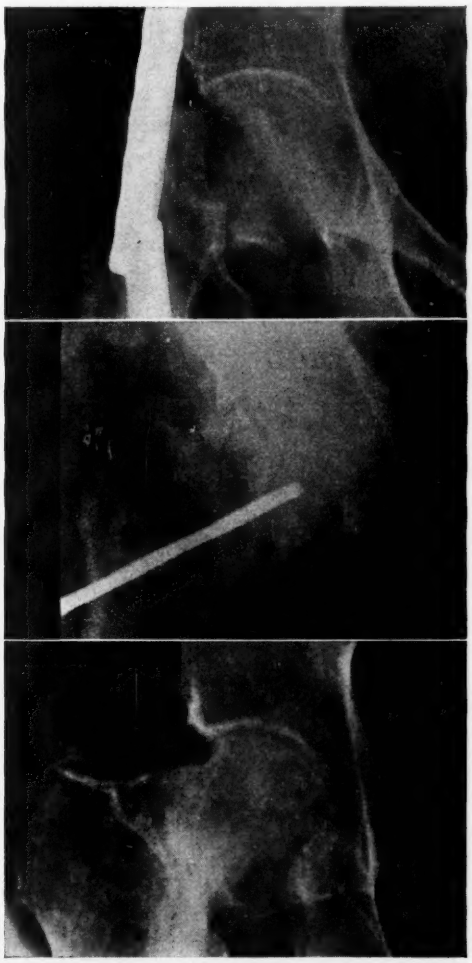

Fig. 2-A. Case 1. Feb. 9, 1934. Age, 76 years. Before reduction.
Fig. 2-B. After reduction and insertion of pin. (2 or 3 pins are now used)
Fig. 2-C. 1 year later.

Even this, however, is far better than any previous popular method. Enough bony unions have been obtained by the Whitman method to extend studies of what happens to the fractured bone and to draw some conclusions. Four possibilities seem to present themselves:

1. Firm bony union of the fragments.

2. A dead head with no union.
3. A live head with no union.
4. A dead head with union.

The fourth classification, that of union to a dead head, is well established and accounts for many cases which break down after months or even years. After studying a number of x-rays it is possible to prognosticate with a fair degree of accuracy whether a live or a dead head may

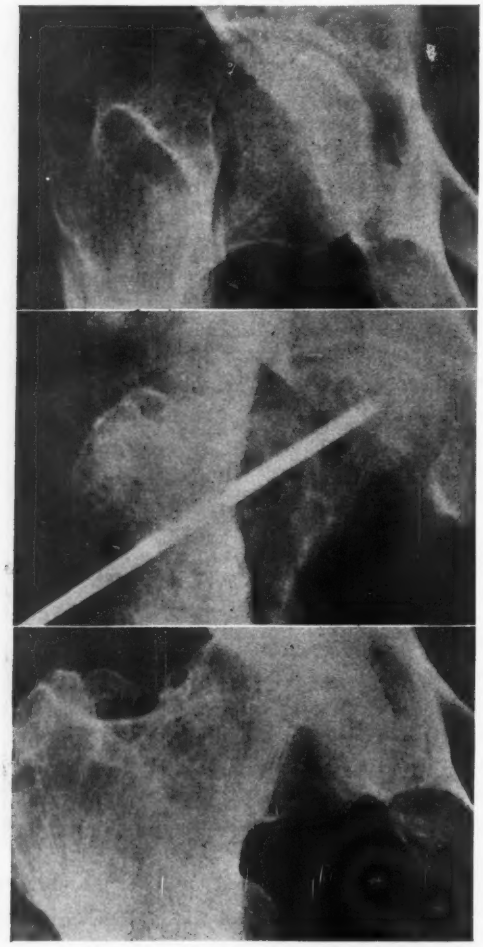

Fig. 3-A. Case 2. Feb. 18, 1934. Age, 61 years. Before reduction.
Fig. 3-B. After reduction and insertion of pin.
Fig. 3-C. 3 months later.

be expected after immobilization for three or four months. The solid, dense appearance of the head should always make one suspicious of an aseptic necrosis, while uniform atrophy, normal after immobilization for several months, points to viable bone.

Steel Fixation Methods. With this background it is possible to better evaluate the steel pin method in comparison with other methods. Although nails and screws have been used by various men in the treatment of this fracture ever since the time of Van Langenbeck, Lister, Delbet and Murphy the method received little active support until refined and popularized by Smith-Petersen in 1931. Since that time a number of individual modifications have appeared but the principle of adequate reduction with the fracture held in rigid immobilization with steel reinforcements remains the same. The use of lateral x-ray views as advanced by Dickey in 1916 has enhanced our conceptions of adequate reduction and is a tremendous aid in checking the proper placement of our supports. With the use of the modern shock proof x-ray machines this addition to our visual apparatus is becoming more generally valued. Often what appears as a perfect reduction on the antero-posterior view is woefully lacking when lateral views are studied, and steel supports which appear adequately placed in one view are seen to be worthless when thoroughly checked by a lateral projection view. At the present time internal fixation of fractured necks of the femur with steel supports is the method of choice of many orthopedic surgeons such as Johannsen, Boehler, White, Gaensler, O'Meara, Steel, Telson, Henderson and many others. Each has his own modification of method but the reports of results are uniformly more favorable than with any previous method. Some use Kirschner wires for fixation, others for guides; some use the Smith-Petersen nails and others knitting needles. The principle remains the same. Many make a surgical opening down to the bone; a few do blind nailing.

Author's method. The method we have employed is a combination of several modifications and probably there is not a single new, individual feature about it. We have worked at it long enough now that it appears to us to be the safest and simplest method but in other hands other methods undoubtedly are as easy and as fool-proof. The nails we use are made of so-called eighteen-eight stainless steel which has been shown to be the most inert of all usable

metal supports when exposed to the body chemistry. The old Smith-Petersen nails often lost considerable volume in the body and underwent some disintegration. The size of our nails varies according to the size of the patient but in general they run from one-eighth of an inch to one-quarter of an inch in diameter and are about

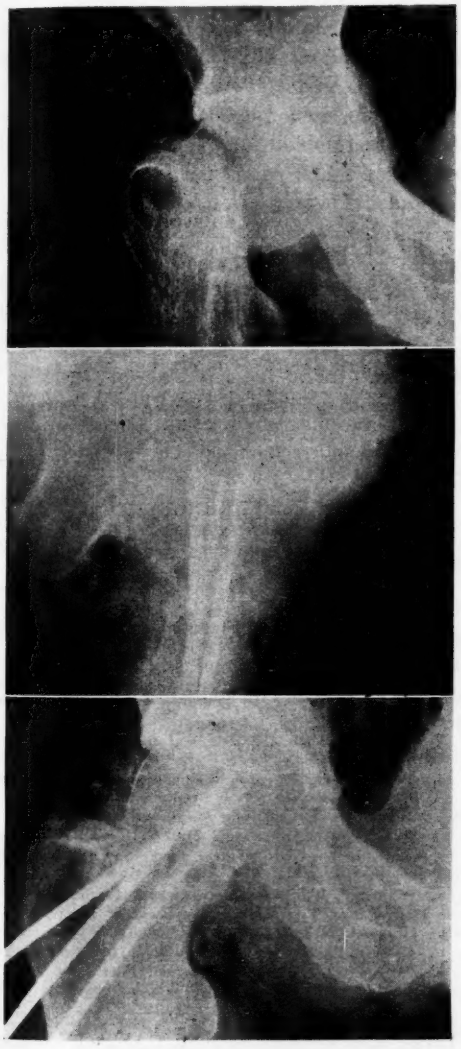

Fig. 4-A. Case 38. Before reduction.
Fig. 4-B. Lat. view after reduction.
Fig. 4-C. A. P. view after reduction.

six inches long. They are fashioned with a drill point and are not hammered but drilled into the bone. There seems to be less shock and less chance of fragmentation with drilling and certainly less trauma. A Henderson or a Magnuson hand chuck is used for the drilling. Attempts have been made to use an electric drill but it was difficult to get the "feel" of the pin entering the head and since the hand chuck works with very little more effort it has been retained. Reduction is carried out on a fluoroscopic table with Buck's extension on the leg fastened to a ratchet traction on the wall.

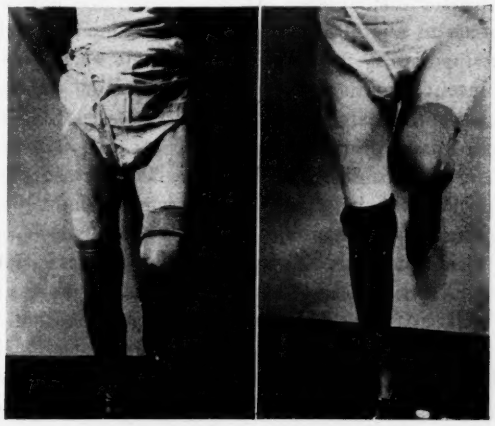

Fig. 2-D. Stable Weight-bearing hip.
Fig. 3-D. Negative Trendelenberg sign. Patient returned to work 4 months after fracture.

Counter pressure is obtained by a canvas strap, well padded, placed over the perineal region and fastened near the head of the table. The Whitman method of reduction is employed except that wide abduction has seldom been found necessary. Satisfactory reduction can usually be obtained by this method but occasionally vertical traction in a flexed position gives better reduction in difficult cases. The reduction is checked by antero-posterior and lateral x-ray views. No anesthetics except morphine and novocaine are used.

After satisfactory reduction has been obtained the area over the hip is surgically prepared and the pins are drilled in under rigid aseptic conditions. The horizontal line of the pin is easily obtained by fluoroscopic view and the pin is pointed slightly upward in the perpendicular plane. When drilling by hand it is, of course, very easy to feel when the pin crosses the line of fracture and engages the proximal fragment. Occasional fluoroscopic views are made to determine the correct line and the depth of penetration, the hands being withdrawn from the

fluoroscope while that is in operation. Two pins are inserted well into the head in the line of the neck and the distal ends are cut with bolt cutters to about three-quarters of an inch outside of the skin. No stitches are necessary. Antero-posterior and lateral x-ray views are again employed to check the placement of the pins. Traction is then removed, the patient placed on a Hawley table and a short, light plaster cast applied extending from the umbilicus to above the knee. This small additional support may not be necessary but it is relatively inconvenient and it facilitates handling of the patient. Many men use no cast at all. Sterile dressings are applied over the pins and no pressure is permitted on the pins. This pressure is avoided by incorporating a large doughnut-like ring of plaster around the pins which can move inside the ring. The patient can be placed in a semi-sitting position and can move the knee at will. After a few days the patient can usually roll over without aid. Except in exceptional cases weight bearing is not permitted until after a three month period has elapsed and the x-rays show satisfactory union. Then the pins are removed and crutches employed until solid union has resulted, If any cast complications arise the cast is removed and the patient's mobility limited.

Results. Our series at the present time comprises 42 cases with 27 central neck fractures. The average age is about 68 years and the first case was done February 9, 1934. This case returned to work four months after a central neck fracture. Follow-up x-rays have all been excellent. We have one definite non-union in a case done over two years ago, the breakdown occurring only a few months ago, after the eighty-one year old patient had been walking and had resumed her natural activities for more than a year and a half. This non-union only emphasizes the futility of trying to evaluate the results of any series of central neck fractures in less than two years after treatment. We have three heads which appear non-viable but with apparent union. No other non-unions have been encountered. One infection occurred in a case in which a senile patient worked his hand inside of the cast down to the pins. This infection was a contributing cause of his death. In the series of 42 cases five others deaths have occurred, none of which was attributable to the treatment of the fracture per se. Subtracting the five cases which expired from other causes and six cases in which it is too early to determine the union and one case which disappeared and on which no check-up was possible, we have thirty cases left to consider. Of these cases we may count as failures the three non-viable heads, the one non-union and the one infection. This leaves as failures 20% and as successes 80%, which figure, while lower than that reported by many using similar methods, is still well above the average obtained by methods previously used.

CONCLUSIONS

Whether the rigid immobilization with prevention of rotation of the head is the prime factor, as claimed by many, or whether the drilling is an aid to union as claimed by others, it appears that the method of steel pin fixation in femoral neck fractures offers not only a higher chance of union but a better method of preventing the various complications incurred in the aged by long recumbency or extensive plaster fixation.

REFERENCES

1. Gaenslen, Frederick: Subcutaneous Spike Fixation of Fresh Fractures of the Neck of the Femur. J. Bone and Joint Surg., 17: 739-748, 1935.

2. Speed, Kellog: The Unsolved Fracture. Surg. Gynec. Obstet., 60: 341-352, 1935.

3. Steel, William A. and Grossman, Joseph N.: One Year's Experiment with the Anderson Splint. Internat. Clinics, 1: 226-232, 1935.

4. Speed, J. S.: Central Fractures of the Neck of the Femur. An Analysis of the End Results. J. A. M. A., 104: 2059-2063, 1935.

5. McKenna, Hugh: Fractures of the Neck of the Femur. S. Clin. N. America, 15: 585-591, 1935.

6. Telson, David R., and Ransohoff, Nicholas S.: Treatment of Fractured Neck of the Femur by Axial Fixation with Steel Wires. J. Bone and Joint Surg., 17: 727-738, 1935.

7. Henderson, Melvin S. and Macey, Harry B.: Treatment of Fractures of the Neck of the Femur. S. Clin. N. America, 15: 1199-1206, 1935.

8. White, J. Warren: An Instrument Facilitating Use of the Flanged Nail Treatment in Treatment of Fractures of the Hip. J. Bone and Joint Surg., 17: 1065-1066, 1935.

9. O'Meara, John W.: Fractures of the Femoral Neck Treated by Blind Nailing. J. Bone and Joint Surg., 17: 928-932, 1935.

THE WHITMAN SPICA CAST IN FRACTURES OF THE NECK OF THE FEMUR

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For many years the so-called Whitman spica cast has been almost universally used in the re-

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duction and fixation of fractures of the neck of the femur. As has been emphasized in the previous discussions the fractures in the region of the hip other than those actually through the neck, offer no great problem as they practically all unite if given reasonable replacement and fixation by any method. My discussion therefore will be strictly limited to the old age fracture, the fracture directly across the neck of the femur.

It is sadly true that any method used by many surgeons and during many years of practice is apt to become badly distorted. I am sure that we have all seen many, many casts applied supposedly by the method of Royal Whitman, which have strayed far afield. Sometimes this is consciously done in an effort to improve upon the established method, but oftener, I am afraid, because the fundamental principles set down by Whitman were forgotten. The inaccurate and inefficient use of a method is very apt to give bad results. These bad results should not be used to discredit the method.

Some years ago Henderson reported that in a group of 144 cases of ununited fracture of the neck of the femur a history of inadequate treatment was obtained in nearly all.

As this symposium is intended to bring out the comparative value of the various methods used in fixation of fractures of the neck of the femur, it is hardly necessary for me to go into the method of reduction of the fracture, as practically the same manipulation is utilized by all of us. There are a few points, however, which merit reiteration.

The clinical picture when the patient is first seen is a very familiar one. The patient is usually an elderly person, often an old woman. She lies on her back with the affected leg slightly flexed at the hip and knee. The leg is externally rotated so that the outer side of the foot and leg lies on the bed. There is usually some shortening. A Rentgenogram of the hip shows a fracture through the neck. Right here I want to emphasize the fact that an apparent shortening of the neck in this rentgenogram does not indicate an impaction of this fracture. Impaction of these fractures is a clinical conception, or misconception, usually based on the inability of the examining physician to feel crepitus in the fracture plus the apparent shortening of the neck as shown by x-ray. In my opinion impaction in these fractures, if it ever occurs, is exceedingly rare. Of course, incomplete fractures do occur without displacement, and of course, require no reduction.

The shortening of the neck of the femur seen in the x-ray is produced by the external rotation of the leg, which causes the fractured end of the neck to be turned forward so that the antero-posterior view no longer shows the neck in profile, but actually looks into the fractured end of the neck. This external rotation of the shaft of the femur brings the lesser trochanter into prominence in the picture. If the x-ray shows both hips, the lesser trochanter on the affected side will be in profile, and will show up much more prominently than in the normal hip. Whenever, therefore, the clinical picture is the classical one, described above, with external rotation of the leg, the hip is not impacted. In my opinion, in the care of fractures of the neck of the femur the possibility of an impaction being present should be disregarded. The accurate adjustment of the broken surfaces brought about by the method of correction used by all of us not only does not endanger a union, but actually is the only means of giving a chance of a union.

The manipulation which I employ is the one described by Dr. Ruth, who advocated the old Maxwell-Ruth method of treatment of these fractures. It is done ordinarily under some type of anesthesia, with the patient lying on a fracture table with the well leg attached to the traction apparatus in fairly full abduction. The affected leg is grasped firmly and flexed to a right angle at the hip and knee. With one hand under the knee, and the other under the great trochanter the leg is lifted, not powerfully, and rotated into good internal rotation. With the leg and hip muscles relaxed by the flexed position, this is rather easily done. Without relaxing the lifting force, the leg and hip are gradually brought into full extension and wide abduction, the lifting force gradually changing to one of longitudinal traction until the reposition of the fragments is actually locked into position by the abduction and internal rotation. Whitman's original theory was that the full abduction actually caused the great trochanter to impinge against the pelvis. Certainly the abduction

which we employ, and which he described in the application of his cast, is not sufficient to cause such an impingement. If there were such an impingement I believe it would tend to separate the fractured ends rather than push them together. The locking of the fragments into position is caused I believe, by the tension of the supporting muscles and ligaments about the hip joint, the greatest strength being supplied by the tension on the adductor group of muscles.

With the leg in this position the application of plaster is a simple matter if certain fundamentals are kept in mind. The abduction, internal rotation and extension must not be relaxed during the application of the plaster. The knee is slightly flexed to relieve the strain without any flexion of the hip, however. This slight bend makes the internal rotation easier to hold. The position seems to give a solid fixation of the fragments. This fixation, however, is only temporary, and would be lost very soon due to the tiring of muscles. The firm fixation must therefore be held by the plaster.

For this reason the plaster is extended high on the chest on the side opposite the fracture. If the Whitman single spica cast is used, abduction of the leg can not be retained unless this is carefully adhered to. We have all of us seen casts applied after a good reduction in which the only mistake made was that the cast extended up only to the waist line. Immediately after the application of such a cast the affected leg may be brought over to the mid-line and the band about the pelvis and waist simply slides up and 90% of the abduction is immediately lost. In my opinion, the failure to extend the cast on the well side up to the nipple line is one of the outstanding reasons for non-union in these fractures and is an argument against inefficiency in application, not an argument against the Whitman spica. If the Whitman cast is applied high on the side opposite the fracture, is molded snugly over the great trochanter and extends to the toes on the fractured leg the fixation is not only immediately perfect, as can be proven by x-ray, but is exactly the same three months later, when the cast is usually removed. There is some difference of opinion as to the length of time following the removal of the cast before unprotected weight bearing can be allowed. This time period would be the same whether the Whitman or some other method were used. It is at this time after the removal of the retentive apparatus, or cast, that considerable judgment must be exercised. If there is a union at the end of the three-month period, certainly it could not be regarded as a solid one and the general feeling is that weight bearing earlier than six months from the time of the fracture should rarely be allowed, and in many cases protection from full weight bearing should be kept up for a year.

In determining the duration of the fixation and the prognosis in fractures of the neck of the femur, there are certain factors which must be taken into consideration. These factors which affect the ultimate union of the fractured ends are, of course, present whether the case be treated by the Whitman method or not. However, I wish to touch on them because it is my belief that there is no non-operative method of treatment which so definitively takes these factors into consideration as that of Whitman. The first factor is the much discussed circulation in the head of the femur, and the obvious disturbance in this circulation when the head is broken loose from the shaft and temporarily, at least, must get its blood supply from elsewhere than through the neck.

The second factor and a very important one is the plane of the fracture. In many cases this plane is practically parallel to the line of the shaft and therefore parallel to the line of force applied either when weight is borne on the leg or when the muscles about the hip either relax from too great pull on the fractured leg or contract from too little pull. In other words, there is a natural shearing force working in fractures of the neck of the femur which is practically never present in the usual fracture of the shaft of a long bone where the plane of the fractured surface is more or less perpendicular to the line of force and where weight bearing or the pull of muscles simply tends to force the fractured surfaces more tightly together.

Now what can the Whitman method offer toward the re-establishment of circulation in the head of the femur? It offers the one thing which we regard as necessary in any fracture, and that is firm, snug apposition of the fractured surfaces. The unvarying abduction and firm molding of the plaster over the trochanter gives

this pressure of the raw surfaces together as no other method can possibly do. By that means we do all that is humanly possible to encourage the development of new blood vessels into the head.

Again this firm plaster fixation completely stops movement at the fracture site from the contracture or relaxation of the muscles about the hip joint, and during the fixation eliminates the shearing tendency caused by the fact that the plane of the fracture is parallel to the line of force.

Now I want to say just a word about this mechanically beautiful apparatus known as the well-leg splint. We will grant that the x-ray of the fractured hip directly after the fixation by the Roger Anderson splint is perfect. But after all this reduction was not produced by the splint. The splint is a method of fixation, not reduction. The reduction was done by the doctor and it was good. We feel of the hip and the whole apparatus during the first two weeks following its application is firm and the fixation seems absolute. The x-ray shows some abduction, but certainly not the complete abduction necessary to cause a locking of the fractured fragments in position. What then gives this apparent complete fixation? It is purely muscle tension produced by the pull on the fractured leg and the push against the normal leg. During the first few weeks, while the muscles are still in some spasm and have not become tired out the fixation is good. The cross pull of the adductors draws the neck tightly against the head. As the days go by these muscles tire out and there is no force left to push the fractured neck against the head and our first factor necessary to re-establish circulation is gone.

Now with regard to the shearing strain at the fracture site due to the plane of the fracture lying parallel to the line of pull and push of the splint. Dr. Anderson himself states that the hip must be watched by x-ray and the tension kept up to a certain level. In other words, we have a fracture line lying parallel to a sort of balanced system of muscles and spring and screw apparatus and hope to keep this balance accurate enough to allow the re-establishment of circulation, and a solid union between the fragments.

Perhaps in the hands of Dr. Roger Anderson this accuracy of balance is possible. I doubt it. In my hands it is not possible. Time after time I have felt of the leg and retaining apparatus at the end of the fifth or sixth week, and found the whole so relaxed that eight or ten turns of the screw in the traction apparatus may be made without the patient knowing anything about it. Such a system does not give the fixation necessary to give a union in a fracture of the neck of the femur. Time after time I have seen a slight shift in the position of the head with reference to the neck of the femur in the x-ray, and by means of a few turns of the traction device have put the head back in the original beautiful position. This is the adjustment which admittedly is necessary in using the Roger Anderson apparatus. But if the move- is sufficient to be seen in the x-ray isn't the damage to the newly forming blood vessels and callus already done?

Recumbency in a Whitman spica with the cast to the nipple line on the side opposite the fracture is sometimes difficult for very old people to stand. In fact occasionally I have been obliged to use a double spica cast in some of these old people in order to cut the cast low over the abdomen and even allow a partly sitting position. Occasionally too I use the Roger Anderson splint for a few weeks until the very old person is past the period of acute pain and spasm, recognizing that the life of the patient may be saved even though the fracture never unites. It is my firm belief that the same firm fixation is necessary in fractures of the hip which is necessary in all other fractures, and that up to the present time the Whitman spica has no real competitor in the care of fractures of the neck of the femur.

DISCUSSION ON PAPERS OF H. D. JUNKIN, H. A. SOFIELD, AND H. E. COOPER

Dr. Paul B. Magnuson, Chicago: It saddens me not to be able to start the dog fight which your Chairman hoped to see, but I feel that all the papers read here this afternoon have been presented in a most fair and impartial manner, and certainly each of the methods is a well-accepted method and has a place in the treatment of fractures of the neck of the femur. After all, the object of any treatment is to cure the patient of his ills, and no one method would be suitable for all cases. So that each has a definite place.

It is my opinion, however, that most of us talk methods and advance methods and try to sell methods, when what we should be trying to do is to determine

which case any of these methods will best fit and produce the best result for the patient. We have not arrived at a point in medicine where this is easy, no matter what disease or injury we are treating. What is one man's meat is another man's poison, whether one is treating allergy, constipation or fractures.

In choosing a method of treatment for any condition certain fundamentals must be considered. For instance, if one had a very obese, aged patient, where a Whitman cast could not be applied with any hope of maintaining the fracture in position, it would be folly to choose the Whitman method. And I believe this method is suitable for a limited class of patients. Certainly the reduction of the fracture first, before any method is used, is one of the most important steps in obtaining a good result. I do not think the application of a Whitman cast in the position described by Whitman is a good method of reduction. The Leadbetter manipulation is much more effective, and the reason for this will be apparent when one looks at the anatomy. When the neck of the femur is fractured there is immediate distension of the capsule by blood and synovial fluid, followed by secretion of more synovial fluid due to the irritation caused by the fracture. This bulges the sides of the capsule and consequently shortens it—in other words, the distance between the edge of the acetabulum and the base of the neck, the two attachments of the capsule, is lessened. Therefore, in order to bring the ends of the fragments together, traction should be made in a position which will allow the greatest latitude of motion. The capsule is most relaxed in flexion, therefore the traction should be applied while the thigh is flexed on the pelvis. After the ends are brought into apposition then the knee can be brought out, the thigh abducted and the leg brought into extension. In this position the Y-ligament is pulled tight and the adductor muscles are put on the stretch. If the fracture through the neck is transverse and the reduction has been anatomically perfect, the tension on these two structures will press the fractured surfaces together and practically lock them, but if the fracture is oblique, as is frequently the case, the tension on the adductor and Y-ligaments with the leg in full extension will have a tendency to push the fragments past each other, and anatomic reposition cannot be maintained. Especially is this true if the neck is fractured in a line running from the inferior surface near the head to the superior surface near the base of the neck. Cancellous bone does not break in any set or pre-arranged angle and the lines of fracture are frequently hard to follow. It is my opinion that x-rays should be made at four different angles, one in the straight antero-posterior, one lateral, and two between these positions, both before and after reduction. It is absolutely impossible to take these angling x-ray shots when the leg is fixed either in the Roger Anderson or Whitman position. Therefore, I think many of the fractures in which we claim anatomic reduction, and in which non-union results, will be found on closer investigation not to be anatomically reduced.

As to the Roger Anderson method, the maintenance of the position of the fragments is entirely dependent on traction pulling down on the leg on the affected side and pushing up on the well leg. This will hold a moderate amount of abduction, but after the swelling in the capsule disappears the fragments can be separated sufficiently to allow synovial fluid to bathe the ends of the fragments and create a gap between them, which nature cannot bridge with callus because in this location there is no blood clot to act as a structure for such bridging. The circulation of the hip, too, has much to do with non-union. Walcott has shown that blood enters the neck of the femur and the head of the femur not only through the small artery in the ligamentum teres but through the capsule of the joint, and the entrance of this circulation is entirely confined to the posterior upper and posterior lower part of the visceral capsule. If the line of fracture starts on the posterior surface of the neck near the head and runs obliquely forward and outside, the major portion of this circulation is cut off from the proximal fragment, that is, the head and the portion of the neck attached to it. So one would feel that in this type of fracture there would be less likelihood of obtaining union than in a transverse fracture through the exact middle of the neck where there was not sufficient tearing of the visceral capsule to interfere with the blood supply.

Internal fixation by nails, wires and bone graft, has undoubtedly come to stay. Blind nailing does not appeal to me as a sensible and logical method of treatment. There have been some good results reported from this method and the percentage of unions has been much higher than with any other. When one starts to look for the reason for this, he is inclined to the belief that if the two fragments are brought into anatomic reposition and firmly fixed there so that there is no chance for leakage of synovial fluid between the fragments, if the fragments are held firmly in normal relation to each other, and if there is a mechanical stabilization which allows the upper fragment to follow the lower fragment in every movement of the patient's body, the percentage of unions should be much greater under these conditions than under more hit and miss methods.

No method is going to produce 100% unions in fractures of the neck of the femur. Many patients are poor surgical risks under any conditions. Therefore in choosing THE method to use on A patient, the patient's physical structure and physical condition as well as the anatomic and mechanical difficulties to be encountered should be considered before any one method is chosen for that particular patient. There will never be agreement, but if we study our cases from the standpoint of the possibility of maintaining anatomic reposition of the fragments and the ability to hold this anatomic reposition of the fragments for a sufficient length of time for union to occur, there will be many more good results following fractures of the neck of the femur than there have been in the past.

Dr. F. J. Otis, Moline: I wish to say a few words on the home care of the intracapsular and other fractures of the leg. The important considerations are:

first, efficiency; second, comfort to the patient; third, comfort and ease of operation for the nurse; and fourth, ease of accomplishment for the physician. If a method cannot reach this standard, although it may be good it may not be usable.

Note for a moment the efficiency our professors taught us in Buck's extension. However, it required placing the patient on a board or placing boards under the mattress to effect the proper efficiency. But it took the comfort away from the patient, and it was extremely difficult for the nurse to handle.

Professor Murphy used the Rainey's tripod and became very proficient. His staff were artists in handling the patient in bed. He also used the tripod cast. But it was difficult for us to duplicate his efficiency. Therefore we took note of the young men who had found difficulty in helping the nurses manage these cases. Even with the proficiency of the Whitman cast, maintaining excellent position in the 45 degree angle, it was hard for the nurses to handle the patient. So there developed some methods of suspension of fractures and lively competition between the advocates of Davidson's suspended cast and the Hodgen's splint.

The suspension principle was sound for giving comfort to the patient and assisting the nurse. It is important to notice they recommended a suspension close to the mattress. You will see considerable traction can be secured from the traction on the calf by the slight flexion of the knee. This traction would amount to from five to eight pounds, and often during the convalescent stage, when all adhesive extension has been removed, this mild traction may be maintained by cradling the limb in this splint. You will notice those advocates required the pull at a 45 degree angle. Analyzing a 50-pound pull, 25 pounds goes for supporting the leg in the hammock and another 25 pounds is exerted through the skin traction to the bone with a little supplemental assistance from the traction behind the calf. This is important also because it secures such efficient traction one will not so early be required to resort to skeletal traction. This is more difficult to carry out in the home than the non-surgical procedure.

With the Balkan frame came the Thomas splint, and there developed a great error of elevating the limbs high. The skin traction was wasted in supporting the limb so only a little traction was left to be applied to the bone. Thus it became necessary to use the Steinmann pin and Kirschner wire, which we did not want to use in the home. Therefore, in the home we kept the legs horizontal.

However, the nursing problem was a real problem. As many of these patients were very old we had to place some in the Bradford frame. It occurred to us that these Bradford frames might be attached in the Balkan frames. So we devised a Balkan frame that could be placed on any bed made in the last hundred years except the trundle bed. There were pads to protect the bed. Any member of the family could elevate the patient up and down with ease. The nursing problem became quite simple.

The next question which arose was how could we make it easy of accomplishment for the doctor. We were very much delighted to note there was enough mechanical ingenuity associated with any hip fracture to utilize, so we conceived the idea to have them nominate their mechanic. We had him inspect a frame already in operation, and then take the materials and set them up. It was surprising how quickly he reported the frame ready for use. We were even further astonished to note, when the supply was exhausted, how readily they could reproduce another frame and report it ready and in position. The frame has so few parts—only a few little wing nuts on stove bolts, a simple clamp or two to tighten and you have constructed the whole thing. It is very economical. Manufacturing firms had preceded us in the idea with a rather expensive bed. These were supplied in such limited quantity that only one patient could be accommodated. This made it necessary for us to transfer some of these frames to the hospitals. There we achieved another great success. The convenience to the nurse was so appreciated by the nurses that they went to great efforts to get the doctors to use these frames. Then the hospitals developed a supply of them and for teaching purposes they kept one set up. This was also a convenience to us who were doing fracture work in the home. When we had no frame, we sent a friend of the patient and a mechanic to the hospital to inspect the set-up frame. Soon we had another frame set up at home, saving much of the doctor's time.

In the hospital the doctors had some of their own frames and often chose to put them up, but they had to do it themselves. These did not include the Bradford frame, and in order to have this Bradford frame the nurses volunteered to have the frame all set up waiting for the doctor. This was an astonishing convenience and so successfully carried out by the nurses that I was surprised to observe two probation nurses carry an outfit into the room. It was not long until it was set up and the doctor had been required to spend only a few moments in suspending the limb in the frame.

I will present to you one case which is typical of the results attainable in the home. This is a patient who incurred an intracapsular fracture. The x-ray check showed the limb held in most excellent position. Six months later it had organized with a slight shortening, but with possibilities of very little deformity. Unfortunately, at this time she and her husky son attempted to pass through a swinging door at the same time. As a result of the fall she sustained a fracture through both trochanters, and an apparent weakening of the intracapsular fracture. Again the Thomas splint, swung low as the Hodgen's splint had been before, pulled the parts all into perfect alignment, even breaking up the impactions. The neck, which apparently was badly strained and impacted on its lower surface, was loosened and realined in quite perfect position by this efficient traction. As the patient had already become an artist in the use of the caliper, and as it [illegible] extracapsular fracture, she was per-

mitted to get up a little sooner, but was not allowed to bear weight on the limb for a year.

Some months after the second fracture we have quite a perfect result. There is practically no shortening, but when compared with the picture taken several years later you will see that even after the seventh month there was a little shortening of the neck from the weight-bearing which was eventually applied. In the end, however, we got a very perfect result functionally. The x-ray picture shows the rearrangement of the structural lesions of the bone, and emphasizes to us again the importance and absolute necessity of nature withdrawing all that old bone and building a new one, with new and proper lines of stress that will meet the needs of the individual.

Dr. C. Paul White, Kewanee: I want to ask Dr. Junkin to talk about the pain in the kneees which patients have with the Roger Anderson splint. How long does it take to get them back to using the knees? It seems they have so much pain in the leg around the knees in my experience—I have seen none in a rather small series that did not have more or less pain which was very aggravating, in the knee on the injured side.

Dr. H. D. Junkin, Paris (closing): During many years out in the country I have followed Dr. Magnuson's work very closely, and the work he has done has been monumental. Such men as he are responsible for the fact that out in the country we think more about the treatment of fractures, and we appreciate what the Fracture Committee of the American College of Surgeons and the authorities on fractures have done for us. I thank Dr. Magnuson for his constructive criticism.

I was particularly pleased to hear Dr. Sofield's paper. It seems to me that if the Roger Anderson splint was applied to pull the leg down, then put the pins in and keep the splint on for a few days or weeks, we would find it very useful.

Dr. Cooper mentioned the fact that the Anderson Splint depended upon muscular traction for reduction. The fact is, all of the Whitman Technic is carried out and the reduction is strictly skeletal. This I feel was well demonstrated in the lantern slide showing the splint applied to the skeletal structures. If an end to end reduction is effected, a certain amount of relaxation would be beneficial and would place the fragments in closer apposition. We have found it necessary to release traction rather than to put more traction on following reduction. In our experience with the Whitman dressing, much relaxation and slipping in the cast always occurred. Most of our patients got along very poorly because of the cast extending onto the chest which we felt was responsible for the frequency of hypostatic pneumonia.

Dr. Oliver of Kewanee asked me about the stiffness in the knees and pain in the hips following the use of the Anderson splint. It is true that patients experience some stiffness in the knee, particularly the old patients, but the pain is more in the well leg than the injured leg. There is a little point that I got from Dr. Anderson: that is to turn the feet out rather than in; when the cast hardens you will have the pressure evenly distributed on the feet and a great deal of the pain will be obviated. Cut a fenstra over the patellae and then freely move the patellae every day. Much of the pain will be eliminated. Most patients complain of pain in the well leg, not the injured one. Here diathermia offers much relief. With the short wave diathermia heat is passed directly through the cast into the soft parts. Then, the fact that the Anderson dressing permits the patient to be up in the wheel chair and the frequent change of position of the lower extremities relieves much of the pain. Another point—the cross bar can be arranged to give increased abduction by using a long iron which you can have made by any blacksmith. This increased abduction is desirable in certain neck fractures and in various reconstruction procedures about the hip.

Dr. H. A. Sofield, Chicago (closing): I think Dr. Junkin's suggestion of using a Roger Anderson splint to bring about reduction before putting in the pins would be a good idea if you did not have other material available at the time. The lateral x-ray is all important. I have seen what appeared to be perfect reduction in the anteroposterior view and then when a lateral is taken, found it off entirely. It is pretty hard to figure how the Anderson splint brings the trochanter forward in order to oppose the head. I do not think you need absolutely perfect reduction to get union. Walcott's study on the circulation has been pretty revealing. Some men drill through the head and then remove the drills. The main objection I have had to the Whitman cast is the fact that you cannot hold the bone in perfect alignment unless you run the cast up over the shoulders, because you always have slipping up of the pelvis, particularly in stout patients, and in older patients treatment with a Whitman cast is almost as severe as the fracture itself.

FAILURES IN NATURAL CONCEPTION CONTROL AND THEIR CAUSES

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It was in the fall of 1932 that we first began to advise women how conception could be avoided by practicing abstinence during the fertile period. By correspondence, more than 25,000 women were contacted. Up to the present time, 59 complaints have been received from users of the method. They stated that they became pregnant against all expectations after using the Ogino-Knaus biological law. Since about 95% of these women, representing all walks of life, were not seen clinically, it was

necessary to collect our information from written records. We did not always get all the facts desired, but the great majority of these women cooperated in a most commendable manner, so that we are in a position to clearly classify most of these cases.

The cases of involuntary pregnancy brought to our attention can be divided into the following groups:

A. Two actual failures.

B. Twenty-three women erroneously had intercourse during the conception period (for details see Table 1.).

C. Thirteen women had an insufficient menstrual record (from one to four months). Some of these cases are illustrated in Table 2.

D. Fourteen women proceeded to use the method without any menstrual record at all.

E. Two women used the method immediately after childbirth.

F. One irregularly menstruating woman.

G. One pathological case (inflammation of the cervix).

H. Three pregnancies due to mental shock, change of climate, and marked variation in physical habits, etc.

GROUP A.

Case A-1. A woman, 32 years of age, two children, slight leucorrhea but otherwise in good health, with a menstrual cycle varying between 29 and 35 days, used a formulated type of Concip Calendar successfully for two years. The last menstruation before conception, began December 13, 1934. According to her cycle, the conception period extended from December 24 to January 3. Intercourses took place on December 18, 20 and 22, and on January 7, and thereafter. On the morning of December 19, this woman fell down a flight of stairs, fourteen and a half feet high, and immediately thereafter experienced sharp pains in her abdomen, so that she feared she might have incurred a rupture. Physical examination did not disclose a hernia. The unusual fact was that she became pregnant during the month of December, and aborted about March 10, 1935. One might conjecture that the fall brought on an earlier ovulation, either by direct pressure on the ovary or by strain, and one of the intercourses executed during the second part of December caused a pregnancy.

We reported this case to Professor Hermann Knaus, who gave the following opinion: "This failure is due to the accident the woman experienced post menstrationem; it is, however, very remarkable, because it is the only failure in this field that ever came to my knowledge." (Knaus' letter of May 4, 1935). In June, 1935, this woman resumed the use of the Ogino-Knaus method and has not experienced any trouble with it at this writing.

Case A-2. A woman, 32 years old, four children, with symptoms of a mild form of secondary anemia, by an eight month record established a menstrual cycle varying between 26 and 30 days. She admitted, however, that shortly before the commencement of this record she had a cycle of 32 days. In all menstruations, the flow lasts about three days, then practically ceases for one day, and is then resumed for three days. The last menstruation before the undesired pregnancy occurred, began on June 5, 1935. Intercourses took place on June 10, 11, 26, 28 and 30. All of these intercourses were definitely outside of the fertile period, but still the woman became pregnant. Apparently, no other intercourses were had except on the given dates. In considering the menstrual behavior of this woman, there was a question in our mind, whether to place this case in the pathological group or under actual failures. A more exhaustive questionnaire to the patient and her family physician has so far been unanswered.

GROUP B.

Twenty-three women erroneously or carelessly had intercourse during the conception period and became pregnant. The details of these cases are summarized in a self-explanatory way in Table 1. (It should be noted that the part of the table enclosed by the hatched line represents the fertile period.)

Several of these women had too short a menstrual record at the time of their conception, and should not have begun the use of the Ogino-Knaus method when they did. Since they had cohabitations during the conception period, as figured from their given cycles, they are shown in this group.

Case No. 11, of Table 1, is of special interest. The woman is 28 years old, apparently normal, and in good health. Her cycle varies as follows: 27, 27, 30, 33, 30, 31, 28 (marriage), 41 (took a vegetable compound and medicine to bring on menstruation because of a suspected pregnancy), 34 and 26 days. The next menses started November 5, 1933. Cohabitation occurred November 13 and 14, and again after November 26. Conception apparently occurred on November 13, or 14, (ninth or tenth day of cycle) and a normal child was born August 8, 1934. After the birth, her menstrual cycle continued as follows: 44, 30, 27, 27, 27, 29, 33, 27, 27, 28, 28, 26, 28, 27, 26, 27, 27, 32 and 27 days. After her pregnancy, the woman used a Concip Calendar (26 to 35 day cycle) successfully for the next twelve months and in January, 1936, she began to make use of a 25 to 33 day cycle.

It is worth while to note in this case that the cycles before and after marriage and pregnancy are approximately the same. At any rate, they are within the established upper and lower limits. It also shows clearly that intercourses executed during the fertile period led to pregnancy, but when abstinence was practiced during the conception period, there was no pregnancy for at least nineteen months.

GROUP C.

Thirteen women attempted to practice natural conception control with a menstrual record of a few months only. They became pregnant because the actual variation of their menstrual cycle had not been definitely established. These women cohabitated unknowingly during the conception period. Table 2 shows six of these cases. When looking at this table,

APPARENT FAILURES
INVOLUNTARY PREGNANCIES DUE TO FAULTY APPLICATION OF METHOD

TABLE Nº 1

CASE Nº	CYCLE	MENSTRUAL RECORD IN MONTHS	CONDITION OF HEALTH	DAYS AFTER BEGINNING OF MENSTRUATION	RECORDED MENSTRUAL INTERVALS
1	22 - 29	12			26, 26, 25, 25, 26, 25, 26, 29 24, 25, 24, 24, 24 22 DAYS.
2	23 - 29	10			23, 25, 26, 25, 23, 26, 25, 24, 24, 29 AND 29 DAYS
3	25 - 27	12		EXPERIENCED MENTAL STRAIN DURING THIS MONTH — FINANCIAL LOSS	NO RECORD OF CYCLES
4	25 - 29	8		ABORTED AFTER 7 WEEKS	29, 25, 27, 26, 26, 27 AND 27 DAYS.
5	25 - 29	4		CLAIMS 25 - 29 DAY CYCLE	27, 26, 27, 27 NO OTHER RECORD
6	25 - 34	5			34, 26, 28, 29 AND 35 DAYS
7	26 - 31	11			NO RECORD OF CYCLES
8	26 - 32	12			BIRTH, 28, 27, 25, 26, 28, 28, 26, 28, 27, 32 AND 29 DAYS
9	26 - 33	2		HAD MORE INTERCOURSES, BUT DID NOT STATE DATES	NO RECORD OF CYCLES
10	26 - 34	6		HAD OTHER INTERCOURSES, BUT DID NOT GIVE DATES	34, 29, 26, 30 AND 28 DAYS
11	26 - 34	11		HAD OTHER INTERCOURSES OUTSIDE OF CONCEPTION PERIOD. DATES NOT STATED.	27, 27, 30, 33, 30, 31, 28, 41 (about) 34 AND 26 DAYS.
12	26 - 34	12	CLAIMS ILL HEALTH	HAD VARIOUS OPERATIONS	29, 28, 29, 27, 29, 29, 40, 25 (MAY HAVE BIRTH ON 34, 39 AND 50 DAYS
13	27 - 33	5			ONLY PART OF RECORD ON HAND 32, 33, 31, 33 AND 25 DAYS
14	27 - 33	4		HAD OTHER INTERCOURSES OUTSIDE OF CONCEPTION PERIOD. DATES NOT GIVEN	27, 26, 29 AND 26 DAYS
15	27 - 33	4			27, 29, 29, 28
16	27 - 34	9	BLOODY DISCHARGE BETW. MENSES		BIRTH, 28, 31, 34, 31, 31, 29, 27, 29 AND 29 DAYS
17	28 - 30	2		HAD MORE INTERCOURSES OUTSIDE OF CONCEPTION PERIOD DATES NOT STATED	28 AND 30 DAYS
18	28 - 30	6			30, 30, 29, 29, 28 AND 28 DAYS
19	28 - 33	6			BIRTH, 29, 33, 28, 36, (MAY), 32
20	28 - 39	11	SINUS TROUBLE		31, 28, 37, 32, 39, 37, 34, 35 31 AND 33 DAYS.
21	29 - 33	4			30, 33, 29 AND 32 DAYS
22	29 - 36	6		HAD OTHER INTERCOURSES DURING STERILE PERIODS. DATES NOT GIVEN	29, 29, 36, 35 AND 29 DAYS.
23	30 - 40	5			BIRTH, 30, 35, 37 AND 48 DAYS

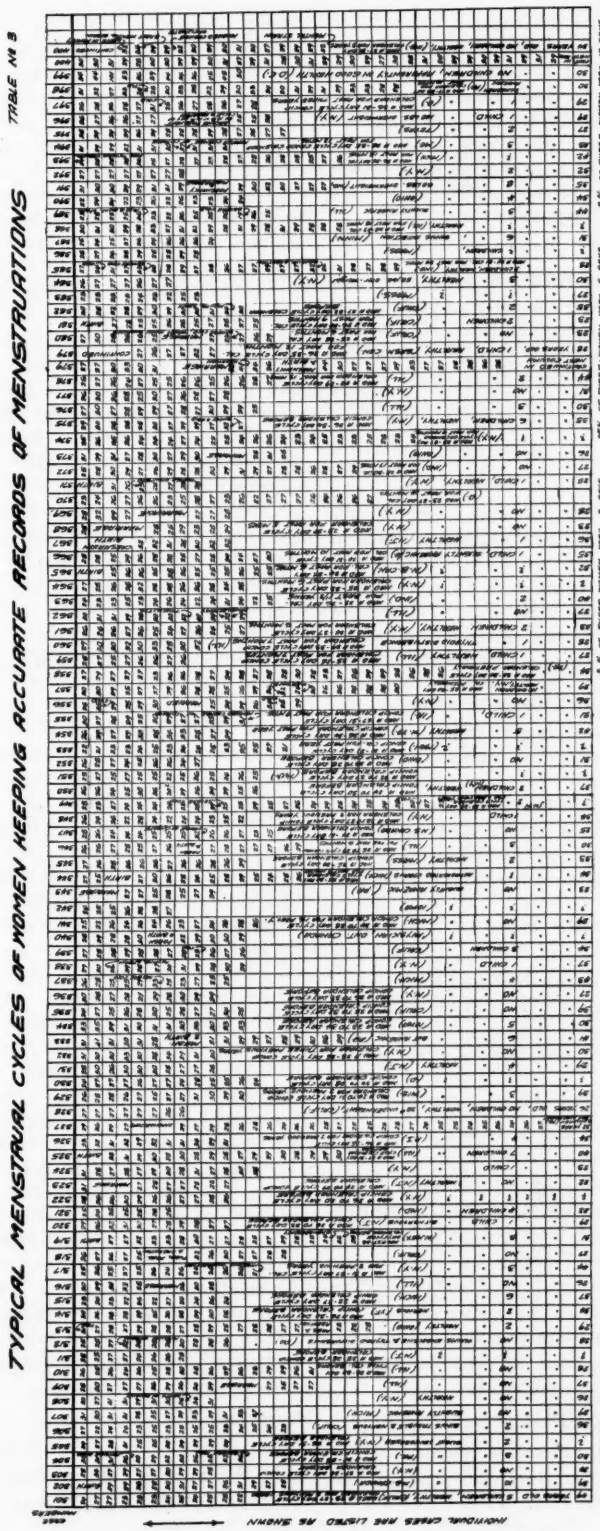
INTERCOURSES X CONCEPTION PERIOD

CASES WITH INSUFFICIENT RECORDS

TABLE Nº 2

CASE Nº	CYCLE	MENSTRUAL RECORD IN MONTHS	CONDITION OF HEALTH	DAYS AFTER BEGINNING OF MENSTRUATION	RECORDED MENSTRUAL INTERVALS
24	25 - 27	2			25 AND 27 DAYS
25	27 - 28	2			28 AND 27 DAYS
26	27 - 30	4			27, 29, 30 AND 28 DAYS
27	28 - 31	3			31, 31 AND 28 DAYS
28	28 - 33	3		MENSTRUATES 5 AND OFTEN 6 DAYS	33, 31 AND 28 DAYS
29	29	1	HEART TROUBLE (SEE BIRTH RECORD)		1 - 29 DAY CYCLE

INTERCOURSES X CONCEPTION PERIOD


TYPICAL MENSTRUAL CYCLES OF WOMEN KEEPING ACCURATE RECORDS OF MENSTRUATIONS
TABLE No 3
CONCEPTION PERIOD
MENSTRUATES 4 AND OVER 8 DAYS
INTERCOURSES X
NOTE:
NOTE: DISTURBANCES OR CYCLES ARE INDICATED WHENEVER THE MENSTRUAL CAUSE COULD BE REASONABLY DETERMINED FROM THE RECORD

it is readily observed that the slightest variation of these cycles may lead to conception. These failures confirm us in our rule that a record of only a few months is not sufficient in establishing the variation of the cycle. Here we might look at Table 3, which shows the menstrual cycles of women who kept a record of the dates of the beginning of menstruation for at least eight months, or more, before the Ogino-Knaus method was used.

GROUP D.

Fourteen women proceeded to practice natural conception control without any menstrual record at all and became pregnant. As they did not have a written menstrual record or a record of the dates of cohabitations, it was impossible to check these cases. However, they prove that a written memorandum is necessary before the method can be used successfully. Memory cannot be trusted in these matters.

GROUP E.

Two women became pregnant when practicing the Ogino-Knaus system immediately after birth. One of these women waited for one menses post partum and then abstained during an assumed fertile period based upon a four months record kept previous to the last pregnancy. It is a known fact that the first two or three menstruations following birth do not always occur with the accustomed regularity (see also Cases No. 333, 340, 371 and 379 of Table 3). During the first two or three menstrual months after a birth, the sterile period cannot, therefore, be determined by mere computation.

The second woman believed that she could not become pregnant as long as she did not menstruate after childbirth. However, she conceived during this period of time and no menstruation occurred between two births.

GROUP F.

One woman with an irregular menstrual cycle varying between 27 and 43 days cohabitated on the 10th and the 20th days of the cycle, as well as before and after these days. Pregnancy occurred because several of these intercourses apparently fell into the conception period.

GROUP G.

A woman with a three months record, indicating a 27 to 29 day cycle, was under treatment for inflammation of the cervix and had been advised by her physician that she could not depend upon the Ogino-Knaus method at that time. She disobeyed instructions and became pregnant apparently during the time she received treatments (diathermy). Case No. 143 of Table 1, Vol. 105, p. 1244, J. A. M. A., is interesting in this connection. It shows that some unnatural interference, such as physical therapy, may temporarily upset the regularity of ovulation and menstruation.

GROUP H.

Case H-1. Patient used method successfully for about two years. Last menstrual date prior to conception was December 26, 1935. Patient was able to furnish records of only five previous cycles. The intervals were 26, 26, 26, 26, and 29 days. In 26 to 29 day cycles, the first eight days would be sterile, the following eight days fertile, and the remaining days until menstruation would be sterile. The only intercourses recorded in the menstrual month starting December 26, were on January 1, (seventh day of cycle) and on January 14, (twentieth day of cycle). Both of these dates were outside of the fertile period, as determined for cycles of 26 to 29 days. These limits, however, were based on the limited record, as given, of only five preceding menstrual cycles. Detailed correspondence brought out as the only further important circumstance that very strenuous dieting and exercising were being followed at the time conception occurred. We believe that injudicious dieting, coupled with unusual bodily exercises may cause a disturbance of ovulation. Likewise, a previous written record of only five months before the use of the Ogino-Knaus method is insufficient.

Case H-2. Patient, wife of a physician, aged 24 years, married November 16, 1935. The recorded menstrual cycles beginning with September were as follows: 33, 23, 31, 28, 27 days. The last menstruation occurred on February 11. Patient's husband met with an auto accident February 28, which shocked the wife severely. Although all subsequent intercourses supposedly were in the sterile period, no menstruation occurred. Here again the sudden fright around ovulation time may have caused a delay of the rupture of the follicle and the insufficient written record of the cycles were not conducive to successful application of the method.

Case H-3. Patient, 34 years old, with a 22 to 28 day cycle, used the Ogino-Knaus method successfully for about one year. The supposedly last menstruation before conception started March 5, 1935. The menstruation prior to the mentioned one began February 11. Cohabitations took place March 2, 3, 27, 29 and 31. All of these intercourses were definitely outside of the computed conception period, but the woman became pregnant and a normal child was born December 5. The month of March was spent under usual and ordinary conditions; however, during the second part of February the woman had a bad fright, experienced a change of climate and was under a severe mental strain. The duration of the menstrual flow was usually five days, but the bleeding beginning March 5, lasted only three days and was scanty. It is therefore questionable if the bleeding of March 5, was a regular menstruation. If conception would have occurred on March 27, or thereafter, the duration of the pregnancy would be only 254 days or less. It is likely that the fright, change of climate, etc., caused a delay of ovulation in the month of February and the cohabitations on March 2, or 3, resulted in pregnancy.

Comment. Case No. A-1, is an actual failure. Case No. A-2 may also be a failure, but on account of its pathological nature it might be outside the pale of the normal and therefore not suitable for the Ogino-Knaus method. All the

other cases experienced and reported in toto are the result of a definite violation of the rules governing natural conception control and cannot be considered failures of the Ogino-Knaus system. In fact, the great majority of these cases are proof that the Ogino-Knaus biological law is correct. The few complaints received from the many users, constitute an extremely small fractional percentage, so that we feel justified in considering natural conception control when used by normal healthy and regularly menstruating women, as reliable.

Since our last publication in the Journal A. M. A.[1], 1,500 additional menstrual records have been collected, 100 of which are shown in Table 3. These records were kept for a period of not

TABLE SHOWING NUMBER OF INTERCOURSES EXECUTED DURING THE STERILE DAYS OF LISTED CYCLES. TABLE 4

WOMEN	CYCLE	MONTHS	DAYS AFTER BEGINNING OF MENSTRUATION 1 3 5 7 9 11 13 15 17 19 21 23 25 27 29 31 33 35 37 39	TOTAL
1	20-29	14	2 1 3 6 5 7 8 8 3 6 5 5 6 3	68
1	21-28	6	1 2 2 3 2 1 2	15
1	22-25	7	1 1 1 2 2 3 1 2 1 1 1	16
1	22-26	12	6 10 9 5 6 7 5 6 8 3 7 2	74
5	22-28	50	2 3 2 1 5 14 16 18 18 14 13 10 8 13 4 1 2	144
2	23-25	24	2 5 11 2 2 4 12 15 3 14 11 9 8 10 10 4 1	123
2	23-26	15	1 4 5 4 2 7 2 10 5 8 10 8 7 4 3 2	82
8	23-27	81	3 2 3 19 12 8 1 4 5 13 16 27 39 39 40 41 33 33 28 10	376
3	23-28	25	5 7 1 8 11 10 7 7 6 7 5 7 2 1	84
3	23-29	27	3 7 6 2 9 15 12 18 14 14 15 10 10 8 3 1 1	148
5	23-30	54	3 5 9 7 8 8 19 14 13 12 22 11 18 7 5 1 1	163
1	23-31	7	5 6 5 8 6 2 4 1 2	39
1	23-33	13	2 5 5 2 3 2 1 1	21
3	24-27	30	1 1 2 11 6 5 1 3 6 7 11 11 16 9 15 11 7 1	124
11	24-28	93	1 5 12 19 27 7 1 15 13 23 31 35 41 48 46 36 25 19 4	408
13	24-29	111	2 2 13 24 22 5 11 42 31 39 43 45 42 42 42 34 27 18 4	488
10	24-30	91	3 9 8 15 17 11 8 15 22 33 39 38 42 39 27 32 20 21 6 3	407
2	24-31	22	1 5 5 3 7 1 7 7 18 13 14 17 7 5 6 2 2 1	121
2	24-32	21	1 2 6 1 3 3 13 6 8 6 4 4 2 2 1 1	83
5	25-27	33	1 3 12 5 4 1 10 16 13 14 11 15 13 12 12 7 3	152
7	25-28	51	2 4 5 8 5 1 6 8 11 15 16 17 17 23 17 21 12 6	194
19	25-29	180	1 9 26 27 61 36 16 5 31 48 57 64 67 84 60 65 65 67 40 34 14	877
14	25-30	112	1 1 7 17 30 24 20 14 4 12 24 33 36 39 43 60 39 45 25 14 3	491
8	25-31	78	4 6 14 16 15 21 22 6 3 27 32 30 18 37 24 29 19 14 5 6 3	351
7	25-32	66	10 10 19 10 5 2 14 20 27 26 16 16 20 13 12 4 2 1	227
3	25-33	28	1 2 6 7 8 3 10 13 9 14 9 13 7 3 3 1 2 2	113
1	25-34	4	3 2 1 4 4 1 1 2 2 3 2 3 3 2 2 2 1	35
3	26-28	22	1 1 1 7 5 7 2 2 3 4 4 8 11 15 10 9 6	96
5	26-29	42	2 3 5 12 19 20 9 2 4 7 14 21 18 22 18 22 14 17 19 6 2	256
12	26-30	110	3 12 26 20 18 6 5 5 11 30 30 41 38 41 36 36 43 45 37 15 6	504
7	26-31	74	1 2 6 6 13 22 39 26 16 4 31 33 35 30 42 37 34 40 29 34 15 10 4	509
4	26-32	33	1 1 2 5 9 11 5 1 9 8 10 13 13 15 14 10 8 5 2	142
5	26-33	50	3 2 2 9 13 26 20 9 3 17 10 16 11 16 19 11 14 6 5 4 2 4	222
1	26-34	12	7 8 4 4 1 2 4 3 4 9 9 7 5 6 6 2 1 2 1	85
1	26-35	6	3 3 1 1 3 3 1 2 1 2 1 1	21
1	27-28	5	3 5 5 6 1	20
6	27-29	37	1 1 4 7 5 7 10 5 2 1 7 18 14 19 9 18 10 15 13 14 8 5	193
7	27-30	56	2 3 7 11 13 9 4 1 5 8 19 24 26 19 22 27 30 28 14 15 6	293
9	27-31	82	2 4 13 28 25 22 20 16 3 7 22 28 25 24 27 20 31 34 33 27 10 10 2	433
11	27-32	100	10 29 35 33 32 22 15 2 6 13 21 33 57 40 52 43 37 38 27 18 6 6	569
7	27-33	74	2 2 5 5 21 22 19 13 8 1 2 4 9 27 23 26 20 22 18 17 8 6 4	284
6	27-34	55	4 9 5 8 18 17 13 10 6 3 17 19 9 16 15 25 28 18 17 12 7 4 2	278
6	28-32	54	1 7 13 20 13 15 9 7 3 15 26 32 22 24 24 20 23 14 18 12 10 2	330
12	28-33	109	1 2 7 22 31 40 33 32 19 3 2 12 25 37 42 36 51 42 47 42 26 12 6 1	571
6	28-35	43	1 3 3 2 7 8 18 21 8 2 5 2 4 6 8 18 14 20 6 15 9 10 5 3 2	200
1	28-36	6	1 4 3 4 3 1 1 1 3 1 1 1 2 1 4 3 1 1 2 3 2	43
4	29-33	40	5 13 11 10 11 5 13 5 2 1 7 16 16 11 9 10 6 7 6 6 2 2 1	175
3	29-34	21	2 2 7 10 8 8 12 10 4 4 13 8 5 7 10 12 10 8 8 4 1 1	154
4	29-35	33	2 7 6 15 14 6 10 6 3 2 5 16 12 16 12 15 16 4 12 7 3 2	191
2	29-36	12	3 2 2 3 8 5 8 6 4 5 3 1 6 8 11 8 9 10 8 7 6 2 1 1	126
1	30-33	10	4 1 2 1 1 1 1 1 1 3 1 2 2 1 2	23
1	30-37	8	5 4 3 5 6 3 3 2 1 1 2 1	54
1	31-40	4	2 4 3 3 3 3 1 2 2 3 2 3 2 3 2 1 3 2 3 1 1 1 1	46
265		2353		11222

THE CONCEPTION PERIOD REPRESENTS THE SHADED LINES WITHIN PORTION

less than eight months. The individual cycles of some women are as short as 20 days and cycles of other women are as long as 40 days. The individual variation of 90% of these women, however, does not exceed eight days. The variation of the menstrual cycles of these 1,500 women are as follows:

4	per	cent.	of	these	women	vary	3	days
9	per	cent.	of	these	women	vary	4	days
24	per	cent.	of	these	women	vary	5	days
23	per	cent.	of	these	women	vary	6	days
18	per	cent.	of	these	women	vary	7	days
12	per	cent.	of	these	women	vary	8	days
5	per	cent.	of	these	women	vary	9	days
2	per	cent.	of	these	women	vary	10	days
1	per	cent.	of	these	women	vary	11	days
2	per	cent.	of	these	women	vary	more than 11	days
100	per	cent.						

This type of records collected over a period of several years indicates that the menstrual cycle may be temporarily upset by a disturbance such as sickness, physical or mental shock, unusual exertion, great change of climate or altitude, etc. It also shows that, after the disturbance is passed, the cycles usually return to the accustomed regularity. We, therefore, are inclined to believe that the menstrual cycle of the fully mature, normal, healthy and regularly menstruating woman, once determined, stays within the established limits until the onset of the menopause and is amenable to the use of the Ogino-Knaus method of natural conception control.

Confirmatory Data. In Table 4, which is self-explanatory, we have shown 11,222 intercourses, executed by 265 women over a total period of 2,353 months, during the sterile period, without the occurrence of a pregnancy. This material was sent voluntarily by users of the system, who were supplied with a small Record Calendar (as devised by us) and instructed to mark the dates of the beginning of menstruation as well as the dates of intercourses.

The entire confirmatory material published herein has been collected after the publication of the article, "Natural Conception Control,"[1] All told, we have now accurately kept records of 379 women who had 15,924 natural intercourses during the sterile period without the occurence of a pregnancy. In opposition to these confirmatory cases, few failures are recorded. One of these failures was definitely caused by physical shock (fall) and is undoubtedly a bona fide case, the remaining case is questionable.

CONCLUSIONS

1. At least 57 of the 59 apparent failures are not due to defects of the method of natural conception control.

2. The 11,222 intercourses, executed by 265 women during the sterile period, are further proof that the Ogino-Knaus method of natural conception control is practical and reliable.

209 South State Street.

1. J. A. M. A., 105: 1241-1246, 1935.

THE RATE OF DISAPPEARANCE OF BACTERIA FROM THE SKIN OF THE NORMAL EYELIDS AND THE NORMAL CONJUNCTIVA

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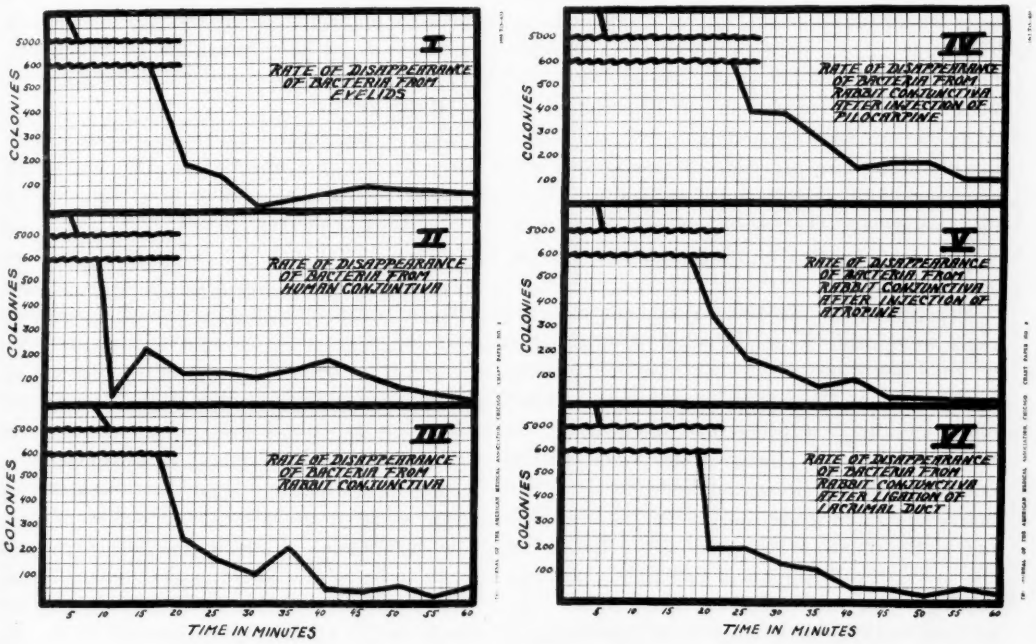
One of the most exposed surfaces of the body is the mucous membrane of the conjunctiva.

Although it is protected from the entrance of large foreign particles by the eyelashes and the mechanism of nictitation, certainly small elements such as bacteria must enter frequently. The bacteria may gain access in small droplets, through the medium of hands, by fomites, or may be carried from the lower lid into the conjunctival sac by nictitation as shown by a previous report.[1] Seldom, if ever, is the conjunctival sac sterile and yet pathology of the conjunctiva is rare in proportion to the apparent opportunities for bacterial invasion. It is the purpose of this paper to show the results of a study of the rate of disappearance of bacteria from the normal eyelids and the normal conjunctiva under varying conditions, and to discuss the factors that may be responsible for this phenomenon.

Stort in 1891[2] using B. coli, instilled one drop of a heavy suspension of this organism into the rabbit conjunctiva, and, making cultures from the conjunctiva on gelatin plates at 1, 5, 15, 30, and 60 minutes, studied the rate of disappearance of this organism. His results showed that the most rapid decrease occurred between 15 and 30 minutes. From 30 to 60 minutes there was a more gradual decrease until at the end of 60 minutes few, if any, organisms could be re-

covered. In our experiments rabbits and one human were employed.

Experiment 1. This experiment was designed to study the rate of disappearance of bacteria from the normal eyelid and was performed on a human volunteer. A one millimeter loopful of a 24 hour agar slant of B. prodigiosus was suspended in 5 cc. of normal saline. An area approximately one quarter by one inch on the upper and lower lids of both the right and left eyes was seeded from this suspension. Cultures were made from these areas every five minutes up to and including 60 minutes using sterile cotton swabs 1/8 by 3/8 inches moistened with normal saline. Plain agar plates were employed for culture and were inoculated by evenly rotating the cotton swab over the surface. The plates were incubated for twenty-four hours and were then allowed to stand overnight at room temperature to enhance pigmentation. The number of colonies were determined by direct count. The results are seen in Chart 1, which is an average of upper and lower lids of the right and left eyes.


I
RATE OF DISAPPEARANCE OF BACTERIA FROM EYELIDS
II
RATE OF DISAPPEARANCE OF BACTERIA FROM HUMAN CONJUNTIVA
III
RATE OF DISAPPEARANCE OF BACTERIA FROM RABBIT CONJUNCTIVA
IV
RATE OF DISAPPEARANCE OF BACTERIA FROM RABBIT CONJUNCTIVA AFTER INJECTION OF PILOCARPINE
V
RATE OF DISAPPEARANCE OF BACTERIA FROM RABBIT CONJUNCTIVA AFTER INJECTION OF ATROPINE
VI
RATE OF DISAPPEARANCE OF BACTERIA FROM RABBIT CONJUNCTIVA AFTER LIGATION OF LACRIMAL DUCT
COLONIES
TIME IN MINUTES

Experiment 2. This experiment purposed observation on the rate of disappearance of bacteria both from the human and rabbit conjunctiva. Bacillus prodigiosus was the test organism for the human, and the test organisms for the rabbit were B. typhosus, B. coli, streptococcus hemolyticus, pneumococcus type III, B. proteus, B. dysenteriae shiga, B. prodigiosus, B. subtilis, and an unknown bacillus probably a saprophyte. Suspensions were made as described above and in each case two drops of the suspension were dropped in the conjunctival sac. Sterile cotton swabs moistened with sterile normal saline were employed for recovery of the organisms. In the human the upper and lower palpebral conjunctivae were cultured, but in the rabbit only the lower palpebral conjunctivae were used, because we had found by previous experience that whereas the bacteria are more disseminated in the eye of the human, in the rabbit the greatest concentration is on the lower palpebral conjunctiva. The technique of culture was as described in Experiment 1, except that blood agar was employed for those organisms more fastidious in their nutritional requirements. Chart II shows the average result of right and left eyes in the human, and Chart III shows the average of right and left eyes in nine different rabbits employing nine different test organisms.

Experiment 3. This experiment was devised to see whether increasing the flow of tears would materially influence the rate of disappearance.

Two rabbits were employed, one weighing 3.7 Kg and the other 2.7 Kg. The marginal vein of the ear was employed in the intravenous administration of one milligram of pilocarpine per kilo of body weight. Five minutes later B. prodigiosus was introduced into the right and left eye of each rabbit as in experiment 2 and cultures were made every five minutes up to and including sixty minutes employing the aforementioned technique. The average results are seen in Chart IV.

Experiment 4. The purpose of this experiment was to see whether decreasing the flow of tears would influence the rate of disappearance. The same rabbits were employed as in Experiment 3, but were not made use of until one week after the completion of Experiment 3. Atropine was administered intravenously allowing 0.5 milligrams per kilo. B. prodigiosus was employed as the test organism and cultures were made as above. The results are seen in Chart V which is an average of right and left eyes in both rabbits.

Experiment 5. In this experiment observations were made to see whether diverting the lacrimal secretions from their normal pathway would influence the rate of disappearance. Under ether anesthesia a probe was introduced into the lacrimal duct. Using a small non-cutting curved needle and intestinal linen, a stitch was taken under the probe and medial to the opening of the duct. While gradually withdrawing the probe, the ligature was tied tightly without cutting into the tissue. The right eyes of both rabbits were treated in this manner. Examination at the end of 48 hours showing no existing inflammation; the rate of disappearance of B. prodigiosus was studied as previously. An additional study was also made on the subsequent day. Nasal cultures were made with each experiment to determine whether any organisms were passing through the duct, and these cultures were negative. The average results of these two experiments are seen in Chart VI.

Discussion.—The rate of disappearance of bacteria from the eyelids is in accordance with the report of Arnold, Gustafson, Hull, Montgomery and Singer[3] who found that the normal skin disinfects itself of 99-100% of applied test organisms in thirty minutes. Johnson and Arnold[5] have shown that in an acid stomach viable organisms are rendered non-viable. Since the skin surface exhibits an acid reaction of Ph 5 to 5.7 Arnold and Singer[5] suggested that possibly the disinfecting mechanism of the skin might be related also to the existing acidity.

The graphs relating to the rate of disappearance of bacteria from the conjunctiva seem to be quite similar in spite of the fact that in specified instances the local physiology was altered. In every instance 99-100% of the test organisms have disappeared in from twenty to thirty minutes. This disappearance can not be explained on the basis of acidity as in the case of the skin inasmuch as we have found the Ph of conjunctival fluids to be between 6.2 and 6.6 using the La Motte method.

That a mechanical factor exists in the removal of foreign elements from the conjunctiva, whether they be bacterial or otherwise, can not be questioned. Maxcy[6] recovered B. prodigiosus from the human nose five minutes after its introduction into the human conjunctival sac. We have recovered large numbers of B. prodigiosus from the rabbit nose one minute after its introduction into the rabbit conjunctiva. Just when the mechanical factor plays its most important role after the introduction of foreign elements such as bacteria into the eye, is, of course, problematical, but it would seem that this maximum effect is early, probably the first five minutes. The mechanical cleansing of the conjunctiva seems to be more efficient in the human judging from graph II, and this would be expected inasmuch as the nictitating mechanism in the human is active and in the rabbit it is quite inactive. The similarity of curves III, IV and V brings up the question of how great a flow of tears is necessary to maintain the normal lubricating and cleansing state in the conjunctiva. It would seem that this may be rather small if we may judge by the fact that in the presence of the atropine reaction the efficiency is as good as normal or when the flow of tears is increased by the use of pilocarpine. Certainly, it would be reasonable to assume that there is a maximum rate of flow of tears through the lacrimal apparatus and when this point is reached, there will be a backing up of the excess tears and the contained elements. When there is a sufficient excess the tears will flow over the mucocutaneous

border on to the lids and face. Increasing the flow of lacrimal fluids, therefore, does not necessarily promote better mechanical removal of foreign elements and possibly may reseed conjunctival surfaces with bacteria due to existing reverse currents contrary to the direction of normal tear flow. In Graph VI, however, obstruction of the normal exit of conjunctival fluids so that the only outward flow was over the lid borders, an equally efficient removal mechanism is evident. This would suggest that there is an additional factor other than the mechanical one.

That conjunctival fluids contain at least one bacteriolytic agent has been amply shown by Alexander Fleming.[7] He termed this lytic agent "lysozyme" and demonstrated that while it is most specific for Micrococcus lysodeiktikus, it is also definitely inhibitory for a variety of pathogenic and non-pathogenic bacteria. Ridley[8] showed that there was a reduction in titre of lysozyme in the presence of acute inflammation, but not in the presence of chronic inflammation. Findley[9] reported a reduction in lysozyme content of rabbit tears during a deficiency diet. James[10] has shown that in the presence of acute corneal lesions the lysozyme titre is reduced. The fact that such a lytic agent exists which can act efficiently in high dilution would probably most satisfactorily explain the similarity of the curves showing the rate of disappearance of bacteria from the conjunctiva inasmuch as, while definite attempts were made to vary the mechanical factor, the lysozyme factors was not interferred with.

CONCLUSIONS

1. The skin of the eyelids disinfects itself of 99-100% of the applied test organisms in from twenty to thirty minutes. This phenomenon may be due to the acid reaction of the skin.

2. Although thousands of bacteria may be introduced into the conjunctival sac, 99-100% will have disappeared in from twenty to thirty minutes. This occurrence is probably due in part to mechanical removal and in part to the bacteriolytic quality of conjunctival fluids.

3. This property of the eyelid and conjunctiva serves as a defense mechanism against bacterial invasion.

REFERENCES

1. Gowen, G. Howard: Amer. J. Ophth., 17: 36-37, 1934.
2. Stort, A. G.: Arch. Hyg. Berl., 13: 395, 1891.
3. Arnold, Gustafson, Hull, Montgomery and Singer: Amer. J. Hyg., 2: 345-361, 1930.
4. Johnson and Arnold: Proc. Soc. Exp. Biol. and Med., 29: 501-503, 1932.
5. Arnold and Singer: Proc. Soc. Exp. Biol. and Med., 27: 364, 1930.
6. Maxcy, K. F.: J. A. M. A. 72: 636, 1919.
7. Fleming, Alexander: Proc. Roy. Soc., 93: 306-317, 1922.
8. Ridley, F.: Proc. Roy. Soc. of Med., 21: 1495, 1927-28.
9. Findlay, G. M.: Brit. Jour. Exp. Path., 6: 16, 1925.
10. James, William M.: Amer. J. Ophth., 18: 1109-1113, 1935.

CALCINOSIS CUTIS WITH HETEROTOPIC BONE FORMATION

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Calcification in the skin continues to be a medical curiosity, even though case reports have been multiplying during the past few years. Still more unusual is the formation of heterotopic bone tissue in the skin or subcutaneous tissues; only a few cases have been decribed. I wish to report a case of calcinosis cutis circumscripta in which bone tissue developed in the skin on the basis of calcium deposits and to discuss the manner in which such changes develop.

The most common form of calcification in the skin (including subcutis) occurs in calcinosis cutis. Other terms employed to designate the same condition are lime gout, petrification of the skin, gout stones, hypodermolithiasis, granular deposits of lime, and calcareous subcutaneous concrements. Two types are usually described: calcinosis circumscripta and calcinosis universalis. My case belongs to the first group which is characterized by the development of circumscribed small, hard nodules of calcium salts. The nodules gradually grow larger and may rupture through the thinned out overlying skin and discharge calcareous masses, after which healing of the single lesions usually follows. The site of predilection is in the finger tips, about the small joints of the hands, or around the elbow or knee. The trunk and larger joints are rarely affected, although in my case the lateral portions of the buttocks were involved. Calcinosis circumscripta may occur idiopathically; in inflammatory lesions of long duration; secondary to fat necrosis; after trauma (Pellegrini-Stieda's lesion,[1] subacromial bursitis, ruptured tendons, etc.); and in thrombosis of veins and arteries.

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According to Tate and Trumper[2], the deposits in calcinosis universalis occur as large placques and masses in the skin and subcutaneous tissues, frequently in the connective tissues of fascia, muscle sheaths and muscles; it may involve the vascular system. Severe ulcerations, often secondarily infected after disintegration of the masses, is not uncommon. These cases may terminate fatally. In calcinosis universalis the calcium is believed to be of metastatic origin, associated with liberation of excessive amounts of calcium in the blood due to bone destruction. When no bone destruction is demonstrable, the term "metabolic" calcinosis has been applied. The blood chemistry as gathered from the literature by Maloney and Bloom[3] is not greatly significant. About fifteen authors report blood calcium values of 8.4 to 12.0 mgm. per 100 c.c.; phosphorus, 3.0 to 6.35 mgm.; two cholesterols were normal. In my case the findings were calcium, 11.5 mgm.; phosphorus, 4.5 mgm.; and phosphatase, 10.3 units; these may be considered as high normal values.

The composition of the deposits consists of large amounts of tricalcium phosphate, a trace of chlorides and a small amount of carbonates and inorganic material.[3] Calcium phosphate constitutes 19.29 to 90.0% of inorganic material; calcium carbonate, 3.0 to 10.0%.

Etiology.—The multiplicity of factors which have been named as the cause of calcinosis indicates that the etiology is still obscure and indefinite. The frequency with which scleroderma and Raynaud's disease are associated with calcinosis circumscripta involving the fingers has fostered the idea of a circulatory insufficiency as the underlying cause. Endocrine dysfunction has been suggested by Davis and Warren[4] who reported two cases occurring in elderly diabetic women. Dawson and Struthers[5] reported a case of generalized osteitis fibrosa with parathyroid adenoma and metastatic calcification in all organs and tissues in the body. Davis and Warren[4] believe that renal disease may alter the calcium metabolism. Epstein and co-workers[6] observed quite pertinently that uncomplicated calcinosis is rare. Scleroderma, arthritis, dermatomyositis, myositis fibrosa, osteomyelitis, chronic nephritis, Raynaud's disease and arteriosclerosis, named in the order of frequency, occur in combination with calcinosis.

Many authors favor the theory of faulty nutrition due to impaired peripheral circulation. H. Davis[7] noted certain common features about calcium deposits in Raynaud's disease. They occurred in women whose peripheral vessels were susceptible to cold; deposits usually involved the acra, which were the coldest areas; he noted no disturbance of calcium metabolism. Barr[8] observed calcinosis as a condition frequently associated with scleroderma; he stated that abnormal calcification depended on diminished blood supply. Weisenbach, Basch and Basch[9] reported circulatory injury with capillary disorders in all of their cases. Durham[10] noted enlargement of capillaries with bulb-like distension of the venous ends; blood flow was sluggish; after injection of adrenalin almost complete stasis resulted in the smaller capillaries and a marked decrease of speed in the larger ones.

Although Barr[8], Thannhauser[11], H. Davis[7] and others agree that a generalized disturbance of calcium metabolism is unlikely, and although they emphasize the idea that the process of calcinosis is an expression of a locally damaged tissue, a dystrophic calcification, certain systemic factors may also favor the local deposition of calcium (Wilson[12]). Rabl and Kleinmann[13] found that disturbance of the acid-base equilibrium caused a marked change in the renal excretion of calcium and phosphorus, although the bowel output was but slightly altered. Wilson[12], however, in a single case was unable to produce any effect by alkalinizing the patient or placing her on a high protein, acid-forming diet. In this particular case the unusually high cholesterol (470 mgm. per 100 c.c.) in the blood stream may have produced an "endogenous hypervitaminosis D" which could cause the calcium to deposit in the soft tissues of the abused finger tips.

Pathology. Pathogenesis—Tissue damage or degeneration is the underlying process which predisposes to calcification. The affinity of damaged tissues for lime salts is well known. Calcification is often seen in tendons, ligaments and bursae following trauma; in inflammatory disease of long standing; in pressure necrosis of certain tumors or granulomata. Calcification of caseous tuberculous foci, even in bone[14], needs only to be mentioned as another example.

Davis and Warren state that calcification never occurs in normal tissue except in the formation of bone. However, even in the enchondral line of the epiphyseal plate the deposition of calcium salts in the zone of calcification is dependent upon a certain form of degeneration of the deeper cartilaginous layers. I believe that calcification is physiologic to a certain degree, especially after the fourth decade of life, when degenerative changes in the body become more prominent.

The possibility of primary degenerative changes in the connective tissues enhancing calcium deposits is mentioned by Rudolph[15] and Tate and Trumper[2]. This idea may be tenable in cases of generalized calcinosis, but it is certainly an inadequate explanation for the localized form. Tate and Trumper believe that the lesions occur mainly where the subcutaneous fat is either small naturally or decreased due to disease such as scleroderma. This observation is generally true when the lesions occur in the finger tips or in the skin about the knee and elbow joints, or in the scrotum, but exceptions are conspicuous in such cases as mine where the gluteal region, rich in fat tissue, is involved. Epstein et al[6] mention that a disturbance of the fat metabolism of the epidermal cells is followed by secondary deposition of lime salts. McGowan[16] believes that all calcification is based on necrobiotic changes in which phospholipins are broken up. The phosphoric acid thus set free is neutralized by the blood calcium and deposited as calcium phosphate. Iron in the tissues may have some influence as in the organization of a hematoma.[4]

Returning again to the idea of deficient circulation, the role of concomitant edema becomes significant. Rudolph[15] described a case of dermatomyositis associated with calcinosis universalis in which he observed edema of the extremities. As the edema subsided calcification and improvement of symptoms appeared. Turpin, Brun and Guillaumin[17] also noted acute edema as the first phase, followed by hemorrhagic infiltration, sclerosis and calcification. They felt that the study of the acute phase of generalized edematous scleroderma of infancy, of dermatomyositis, and of ossifying polymyositis might eventually clarify the meaning of secondary calcinosis. Freund[18] states that Desjerine and Ceillier paid a great deal of attention to chronic and diffuse edema occurring in paralyzed limbs showing soft tissue calcification and ossification. The edema commonly encountered is evidently due to paralysis of the vessel walls, consequent to loss of vasomotor control. The transudation into the tissues and joints, periodically exacerbated, may best be compared with an angioneurotic edema, which also is fleeting in character. Nevertheless, Freund continues, the mechanic irritation of tissue by edema may be the etiology of soft tissue calcification and ossification. The acute transudation causes injury by microscopic tears with small hemorrhagic points in collagenous fibers. For a time the loose construction of the subcutaneous tissues permits the accumulation of relatively large amounts of fluid, but if the transudative tension is severe, the collagenous fibers, especially in the connective tissue stroma and in the fascial layers, become stretched beyond the limits of their elasticity and micro-tears and ruptures ensue.

Histopathology.—Epstein et al[6] state that the calcium is deposited in the swollen collagenous fibers, indicating that the pathology is a disturbance of the collagenous material, probably physiochemical. The areas of calcium deposition tend to be acellular. Interstitial deposits have been noted affecting children[4], but are said to be rare. On the other hand, Tate and Trumper[2] found sharply defined masses of calcium salts deposited in spaces between collagen bundles of the dermis and occasionally in the subcutaneous fat. Sometimes a definite zone of inflammatory reaction showing giant cells surrounds the calcified focus. In larger lesions the surrounding connective tissue is condensed to form a fairly definite fibrous capsule.

In specimens from my patient several areas of amorphous calcium deposits were found, included in slightly fibrotic subcutaneous fat tissue (Fig. 1). The calcium salts occupied extensive areas uniformly or were concentrated as granular bodies into smaller foci, which were encapsulated by a dense fibrous tissue or surrounded by a mature granulation tissue whose phagocytic elements resorbed the calcium salts. As a result of this process of resorption the calcified area becomes split up by the invading fibrous tissue, so that in time the calcium salts

seem to have a diffuse distribution within fibrous tissue. (Fig. 3.)

The process of calcification may predispose to bone formation in any tissue, and the skin is no exception. Epstein[6] found bone transformation as an advanced stage of calcification by feeble direct metaplasia with several small vacuolated areas frequently containing two nuclei, but without any sign of cartilage formation. Turpin, Brun and Guillaumin[17] believed that the proximity of zones of hemorrhagic infiltration initiates the osteogenic process in collagenic, fibrosclerotic, cellulo-aponeurotic tissues containing calcium precipitations. Tissue removed by biopsy from one of the two diabetic patients reported by Davis and Warren[4] showed the presence of a small area of primitive bone matrix developing in relation to lime salt deposits.

Fig. 1. A small group of calcified nodules is included within rather fibrotic subcutaneous fat tissue. A fairly definite fibrous tissue wall encapsulates the mass, merging into a rim of calcified fibrous tissue and primitive bone.

In my case several areas showed irregular pieces of mature lamellar bone tissue in intimate relation with the calcified areas, but always separated from them by a sharp lacunar outline. A typical area reveals a calcified body lying in fibrous tissue. (Fig. 2.) The lower areolar subcutaneous tissue becomes more densely fibrotic and gradually merges into the fibrous tissue forming the capsule which envelopes the mass. At the periphery, the denser fibrous tissue is definitely hyalinized and may contain numerous granular or amorphous calcified deposits. Proceeding more deeply into the calcified body, the capsule loses its fibrillar structure as it becomes invested with a ground substance or matrix, which may be well-calcified. (Fig. 3.)

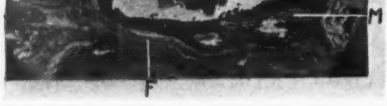

Fig. 2. A higher magnification of a calcified body shows the transition from fibrous tissue (F) to a calcified matrix with ground substance (M) to primitive bone (B). The central mass (C) probably represents calcified collagenous fibers. (See Fig. 5)

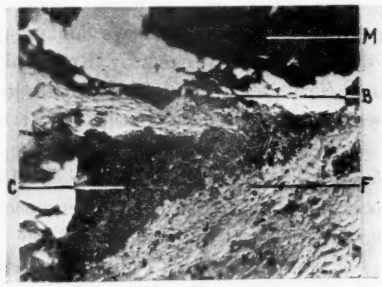

Fig. 3. The encapsulating fibrous tissue (F) which is heavily invested with calcium deposits merges into a triangular transitional zone composed of calcified tissue undergoing metaplasia into bone (C). Within it a number of vacuoles or cell spaces appear containing the primitive osteocytes. Just beyond is a narrow strip of definite bone tissue (B), quite primitive in structure. The central dark mass is composed of an amorphous material, apparently impregnated with calcium salts (M).

In a few places vacuoles or cell spaces appear containing single, sometimes multiple nuclei. This may be considered as primitive fibrous bone of a metaplastic type. Once the bone tissue has appeared, its maturity into lamellar bone is merely a matter of differentiation and bone

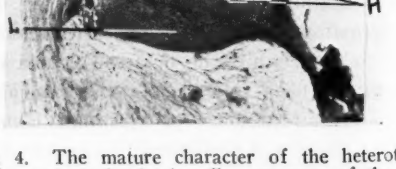

Fig. 4. The mature character of the heterotopic bone is apparent in the lamellar structure of the trabecula (L). A marrow space (S) contains vascular fibrous bone marrow which resorbs the primitive bone along Howship's lacunae (H), preparatory to laying down the mature lamellar bone.

transformation by bone resorption and apposition. The sections studied illustrate these changes, including the presence of small marrow spaces filled with fibrous bone marrow. (Fig. 4.)

Within the rim of bone which now lines the calcified body is found an acellular mass without any particular attachment. (Figs. 2 and 4.) However, it is arranged in heavy parallel bands with occasional longitudinal fissures between them. Although exact tissual classification of dead material is difficult, the general appearance is that of hyalinized and calcified collagenous fibers. (Fig. 5.) The changes, therefore, may be interpreted as follows: first, for some reason or other, an area of collagenous tissue becomes necrotic and secondarily impregnated with calcium salts; second, fibrous tissue encapsulates the mass in the same manner that any foreign body is segregated; third, the afflux of a blood supply peripherally favors the process of reorganization; fourth, metaplastic changes occur so that a primitive bone tissue develops and matures; fifth, reorganization takes place from without inward by a cellular creeping substitution which resorbs the dead mass and replaces it with living matrix or bone; sixth, the central mass remains unchanged for the time being because the living elements have not yet invaded it.

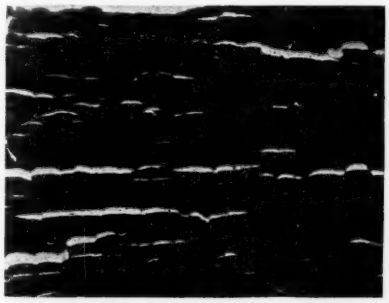

Fig. 5. The magnified central mass seen in Fig. 2 is composed of parallel wavy bands of hyalinized material containing calcium deposits. Although acellular, the general formation strongly suggests the structural arrangement of collagenous fibers.

Treatment and Prognosis. Treatment has been more or less empiric since the cause is indefinite. Ross[21] suggests sympathetic ganglionectomy when the fingers are involved, in order to overcome the impaired peripheral circulation. On this basis, passive vascular exercises might prove beneficial also. Heliotherapy and roentgenotherapy have been mentioned. In my case the patient was relieved of pain and tenderness by resection of the skin and subcutaneous tissue bearing the calcium deposits.

The fate of the calcified bodies varies. For the most part they may persist indefinitely. However, in certain areas where the skin is thin or atrophic the tendency is for extrusion. Hein[19] reported the disappearance of calcareous deposits in a 6½ year old child after use of heliotherapy and x-ray subsequently. However, the specific effect of light therapy is not proved, since Swanson, Forster and Iob[20] state that the deposits in the skin of a 6 weeks' old infant disappeared completely and spontaneously without treatment after six months. One can only conjecture as to the reason for these deposits in childhood; the metabolic activity of tissues in the young is so great as to make complete restitution quite possible once the underlying agents have been removed or readjusted.

Fig. 6. The positive print of the roentgenogram of the right hip and pelvis reveals a collection of calcified bodies lying lateral to the upper wing of the ilium. A number of phleboliths lie within the pelvis.

Comment. The significant feature underlying all forms of calcinosis circumscripta is degeneration of tissue. It is, therefore, unwise to specify any given single factor as the causative agent for all types. Vascular disturbances, trophoneurotic sequelae, trauma, physiologic changes compatible with advancing age, or

mechanical stresses from tension or pressure may result in tissue damage. In instances of isolated lesions, local tissue catabolism may predispose to calcification. This is probably true in later life, when tissue turgor and elasticity decrease with wear and tear. The atrophic, redundant, atonic, senile skin of my patient suggests this likelihood. As the tissue degenerates, certain biochemical changes occur which favor the deposition of lime salts. Bone formation is merely an interesting variant of the calcifying process.

CASE REPORT.

Past history: The patient, O. McC., a white female, was first seen on May 18, 1933, at the age of 55 years. Her original complaint centered around an advanced, severe osteoarthritis of the left hip and an associated secondary lumbar scoliosis. A subtrochanteric osteotomy was performed. On January 2, 1934, a new complaint was noted: tender subcutaneous nodules over both hips, worse on the right.

Local physical examination: Numerous discrete, hard, split-pea to bean-sized nodules were found in the subcutaneous tissue over both hips, along the lateral wings of the ilii. They were more noticeable on the right side.

Clinical laboratory: The blood Wassermann was negative. High normal values were given for calcium (11.5 mgm.) and phosphorus (4.5 mgm.); phosphatase was normal (10.3 units).

Urine was negative chemically and microscopically.

X-rays: Anteroposterior studies of the pelvis on May 19, 1933, showed calcified deposits in the soft tissues above the right hip. There is complete resorption of the neck of the femur, with extreme arthritic changes. The joint space is obliterated almost completely. On April 4, 1935, an anteroposterior view of the right hip shows a number of calcified bodies concentrated in an area lateral to the iliac wing. Their structure is irregular, not concentric, and of varying density. Many intrapelvic phleboliths are seen. (Fig. 6)

Biopsy: Operation performed on April 8, 1935. The redundant skin and subcutaneous tissues containing the calcified nodules were resected from over the right hip. A piece of tissue 4.5 x 3.0 x 0.3 cm. was removed, demarcated by deep fascia on its under surface. At the superficial surface, between the fatty lobules, a large number of white, hard, small and large, bean-shaped nodules is lying in the fibrous tissue septa. Their surfaces are smooth, covered by thin layers of fibrous tissue.

Pathologic diagnosis: Calcinosis cutis circumscripta with heterotopic bone formation (see preceding text under histopathology).

Progress note: On April 14, 1935, the arthritic pain in the left hip still persisted. Numerous small, pea-sized, hard nodules were present over the right greater trochanter, but were symptomless. No pain or tenderness was elicited in the healed operative area on the right side, from which the dermoliths were resected.

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REFERENCES

1. Finder, J. G.: Calcification of the Tibial Collateral Ligament, J. A. M. A. 102: 1373, 1934.
2. Tate, B. C. & Trumper, H. B.: Calcinosis Cutis, Brit. J. Derm. & Syph. 45: 413, 1933.
3. Maloney, E. R. & Bloom, D.: Cutaneous Calcinosis, Arch. Derm. & Syph. 23: 245, 1931.
4. Davis, A. H. & Warren, S.: Calcification of the Skin in Diabetes Mellitus, Arch. Path. 16: 852, 1933.
5. Dawson, J. W. & Struthers, J. W.: Generalized Osteitis Fibrosa with Parathyroid Tumour and Metastatic Calcification, Edinb. M. J. 30: 421, 1923.
6. Epstein, N. E., Paul, S. B., Rusk, G. Y. & Levin, E. A.: Calcification of the Skin and Subcutaneous Tisues (Calcinosis), Arch. Dermat. & Syph. 28: 510, 1933.
7. Davis, H.: Raynaud's Disease Associated with Calcareous Degeneration, Brit. J. Dermat. 24: 142, 1912.
8. Barr, D. P.: Pathological Calcification, J. Missouri M. A. 27: 593, 1930.
9. Weissenbach, R. T., Basch, G., and Basch, M.: Essai Critique sur la Pathogenie des concretions calcaires des Sclerodermies et des syndromes voisins, Ann de med., 31: 504, 1932.
10. Durham, R. H.: Scleroderma and Calcinosis, Arch. Int. Med., 42: 467, 1828.
11. Thannhauser, quoted by Barr.[8]
12. Wilson, Gale: Calcinosis Circumscripta, J. A. M. A. 104: 391, 1935.
13. Rabl & Kleinmann, quoted by Wilson.[12]
14. Finder, J. G.: The Healing Process in Tuberculous Spondylitis, S. G. & O. 62: 665, 1936.
15. Rudolph, C. C.: Calcinosis Universalis and Dermatomyositis, J. Ped. 4: 342, 1934.
16. McGowan, J. P.: Calcification, Brit. M. J. 2: 895, 1933.
17. Turpin, S., Brun, Mlle C., Guillaumin, Ch.-O.; Calcinose sous-cutanee generalisee et osteogenique de L'Enfance, Presse Medicale, 42: 1561, 1934.
18. Freund, E.: On Para-Articular and Para-Osseous Ossification in Spinal Cord Lesions, unpublished.
19. Hein, J.: Calcinosis Universalis, Arch. Surg. 26: 389, 1933.
20. Swanson, W. W., Forster, W. G. & Iob, V.: Calcinosis Circumscripta, Am. J. Dis. Child 45: 590, 1933.
21. Ross, J. P.: Hypodermolithiasis, Brit. Med. Jour., 1: 235, 1934.

RECTAL FISTULA
COMPLICATED HORSESHOE TYPE

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CHICAGO

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Introduction: It has been repeatedly mentioned that fistulae of the rectum are difficult to cure and that many of these cases do not heal properly and invariably require a second operation. Various reasons are given and the criteria are well established. It is equally true that many of these rectal fistulae appear for care much too late for adequate consideration.

I wish to tell you a story of a very interesting case of a horseshoe fistula (complicated) in which I became entangled some three years ago.

The case was that of a woman about 40

years of age, unmarried, who presented herself for care because she simply could not go on any longer. For some unforseen reason huge bilateral ischiorectal abcesses developed involving practically the entire buttock on each side. Her family physician advised her properly but she did not heed his advice and waited until the abcesses on each buttock pointed and a foul and profuse discharge became evident. When she appeared for care we localized the inflamed areas and established "free drainage." About a week later—

Proctoscopic Examination revealed a horseshoe fistula with two possible external tracts (external to the bowel) and two internal openings. The two internal openings comprised the one usually found posteriorly and one additional opening into the bowel on the left side at about 9 o'clock (knee-chest posture) also draining to the exterior. We explained to the patient the necessity of operating in several stages and carefully planned the procedure in three parts.

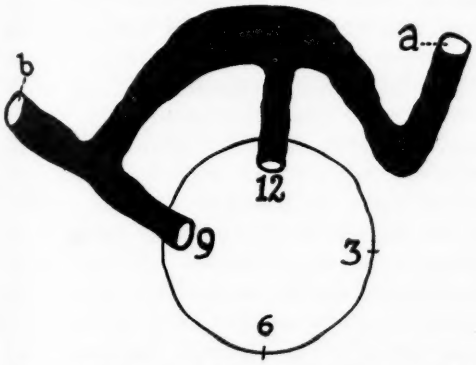

Fig. 1. Diagram showing the rectum represented by a circle in proctoscopic position (knee-chest) with two external tracts (a and b) and two internal openings —one at 9 o'clock (L. side) and one at 12 o'clock posteriorly.

Operation. 1st Stage: The external tract of the left side of the bowel was laid open and allowed to heal. The patient was permitted to leave the hospital for two weeks and then to return for the second stage.

2nd Stage: At this time the internal tract on the left side at 9 o'clock was laid open and the external sphincter was cut at an angle and the fistulous tract resected. The sphincter was not repaired. The tract was kept clean and granulation tissue was built up in such manner so as not to allow any retraction of the edges of the fistulous tract; it is essential to bring the edges of the sphincter to close proximity. The patient made rapid progress discounting the usual difficulties of keeping the tract from healing and closing too rapidly.

The patient returned to us about three weeks later ready for the final stage.

3rd Stage: At this period we directed our attention toward the internal opening posteriorly in the midline (12 o'clock) (knee-chest posture). As you probably know, the posterior fistula almost always necessitates cutting the sphincter in addition to opening and draining the tract widely. At this time instead of depending on scar healing to build up the sphincter, we carefully repaired the sphincter and then systematically built up the scar immediate to it. It is very essential to keep the wound as clean as possible at this final stage and to keep the sphincter at rest long enough to have built up sufficient reinforcement for proper function later. The patient made an uneventful recovery and walked out of the hospital having one or two stools daily. No signs of incontinence was noted at any time up to the present.

Remarks: Apparently just to add more fuel to the fire while under our care the patient had developed, during the three year period, a huge fibroid uterus: about nine months later I performed a hysterectomy. I saw the patient again on August 10, 1936. She stated that she has an average of two normal bowel movements daily, has no pain or discomfort and displays no evidence of any disfunction of the rectal sphincter.

Discussion: One of the most interesting phases of this rectal disease is the fact that fistulae in general are not encountered as frequently now as in the past and that complicated horseshoe fistulae in particular are very infrequent. The English statistics on this entity show a gradual decrease of incidence of rectal fistulae from a ratio of 4 to 1 to a ratio of 10 to 1. Further analysis shows a more marked decrease of ratio of complicated fistulae as compared with simple fistulae. This analogy is logical from statistics just mentioned. It is apparent that better care and early treatment are mainly responsible for the improvement. Over a period of years I have observed 186 cases of rectal fistulae selected from 6,523 proctoscopic

examinations. Of the 186 cases of rectal fistulae only 21 were horseshoe in type and only 12 of the 21 were complicated.

The question of rectal incontinence has interested many proctologists and has kept an equal number in constant fear. In the past we were taught that the internal sphincter as well as the external sphincter were injured in cases of rectal incontinence; and while I feel fairly confident now that essentially it is the external sphincter injury that is mainly responsible for rectal incontinence I continue my regard for the internal sphincter. Some years ago we experimented in this direction on a group of dogs and the results are rather convincing.

The external sphincter is contracted involuntarily while relaxation is produced voluntarily. In this respect it compares with the sphincter of the urinary bladder only. The internal sphincter on the other hand is not controlled voluntarily at all.

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I wish to thank Dr. B. Sladek for referring this case and for his cooperation in the postoperative care.

SKIN MANIFESTATIONS OF DRUG INTOXICATIONS

Dermatitis Medicamentosa

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The dermatological approach to the patient exhibiting either a circumscribed or generalized cutaneous eruption should proceed in an ordered sequence of thought. This is automatically followed by the trained observer and, if consciously applied, will increase the diagnostic accuracy of the physician who is only occasionally confronted with a skin problem. The diagnosis depends chiefly on objective symptoms which are considered as follows:

1. Is the eruption produced by external or internal factors?

2. If internal, are the skin lesions a disease entity in themselves or are they a symptomatic manifestation of some underlying process?

3. If symptomatic, do they belong to the acute exanthemata group or are they the evidence of underlying toxicity?

4. If toxic, are they associated with visceral disease or produced by focal infections, gastrointestinal food sensitivity and poisoning or skin manifestations of drug intoxications?

Whether a dermatitis is caused by external or internal factors can usually be determined by the appearance, variety and location of its component lesions. If external, the lesions appear to be on the surface of the skin; if internal, they are in the skin. The contact dermatoses, occupational dermatoses, eczemas produced by chronic irritations, etc., listed under the group of dermatitis venenata consist primarily of redness due to irritation and trauma, vesicles, papules and squamous lesions in circumscribed areas located most frequently on the exposed surfaces. Skin manifestations of internal toxicities are, in general, not sharply marginated, show no preference for exposed surfaces and primarily are erythematous eruptions manifestly due to disturbances in the cutaneous capillary system. The atypical character of toxic eruptions distinguishes them from disease entities as, for example, pityriasis rosea, lichen planus, disseminated lupus erythematosus, etc., which are diagnosed either by a photographic impression of each disease in its entity or by an analytical compilation of the primary and secondary lesions composing the disease.

The majority of drug eruptions belong to the erythematous type of lesions and must be distinguished from the acute exanthemata, chiefly scarlet fever and measles. In drug rashes, as a rule, there is no elevated temperature and though there may occasionally be slight sore throat, furred tongue, a trace of albumin in the urine and possibly some desquamation, the sequence of events is not that of an acute exanthem for there is not the same definite incubation period, the eruption comes out more suddenly and violently and generally disappears when the drug is stopped. In drug eruptions the patient is generally not toxic, considering the extent and severity of the eruption, and usually presents very few subjective symptoms.

It is extremely difficult, at times, to differentiate drug eruptions from toxic eruptions due to other causes as the skin picture is that of sensitivity with no specific characteristics indicat-

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ing bacteria, food or drugs as causative agents. After the diagnosis of toxic eruption has been made, a detailed history and careful physical examination, when indicated, is required to place the condition in its proper nosological classification.

With a few exceptions, drugs produce non-characteristic dermatoses which may be erythematous, erythemato-papular, urticarial, vesicular and bullous. The type of eruption in each individual case is usually uniform but, as with quinine, may be multiform. The same drug may produce different types of eruptions in different individuals. Individual susceptibility to a drug is usually necessary to cause an eruption and this susceptibility may be hereditary. More frequently the eruption follows the phenomenon of anaphylaxis.

Arsenic. Arsenic is one of the most common causes of drug eruptions and may follow medicinal therapy or result from ingestion and absorption of even minute quantities in food, the arts and industry. Fortunately, arsenic, chiefly in the form of Fowler's solution or the solution of potassium arsenite, is no longer considered a panacea for all cutaneous eruptions and its diminishing empirical use is reducing the incidence of arsenical intoxications. It is important, as with all drugs, to know the early symptoms of arsenical poisoning and to immediately discontinue its use. A resume of the cutaneous arsenical reactions which may occur in the treatment of syphilis will also summarize its toxic symptoms in whatever manner administered.

Therapeutic shock or the Jarisch-Herxheimer reaction is produced chiefly by the arsphenamines in the treatment of syphilis and consists of a flare-up of manifestations of the disease following a large initial dose. It is due to an irritative reaction to an increased liberation of toxins by still living spirochetes or to protein decomposition products and endotoxins resulting from their destruction. The reaction occurs eight to twelve hours following the injection and may be accompanied by fever.

The nitritoid crisis is an acute vascular reaction to the arsphenamines and is an expression of idiosyncracy or hypersensitivity. It has a superficial resemblance to the reaction produced by amyl nitrite and, at the time of injection or within five or ten minutes, is indicated by a diffuse erythema or suffusion, acute edema, laryngeal stridor and loss of consciousness. The patient's entire arm should be observed while injecting neoarsphenamine with any increased redness of the skin an immediate sign to discontinue the injection.

The ninth day erythema is a morbilliform and scarlatiform erythema closely resembling measles and scarlet fever which appears eight to nine days following the first injection of neoarsphenamine. It is attributed to the impaired elimination and retention of the phenol portion of the arsphenamine molecule.

The non-specific cutaneous reactions to arsenic may be the result of acute intoxication due to one or more large doses or to smaller doses in a highly susceptible individual and of chronic intoxication for small doses over a prolonged period. The onset of either is usually initiated by pruritus, particularly of the trunk, palms and soles, and the patient should be questioned repeatedly regarding increased itching. The skin becomes roughened and an erythematous rash, usually commencing on the lateral surfaces of the trunk, may become generalized. It is not uniform and is accompanied by redness, pain and swelling of the palms and soles, edema of the eyelids and results in fine desquamation or an acute exfoliative dermatitis. Rarely the eruption may be vesicular, bullous, pustular and even gangrenous.

The skin lesions following chronic arsenical poisoning may be erythematous, keratotic especially of the palms and soles, pigmentary and may produce hyperidrosis, disorders of the nails and herpes zoster. Occasionally epitheliomata follow arsenical intoxication and are usually added to the hyperkeratosis. Arsenical pigmentation is a characteristic symptom occurring in patches appearing as reticular mottling due to enclosed areas of normal white skin. It also tends to darken normally pigmented areas. The skin is dry, harsh and of increased thickness.

Chronic arsenical poisoning due to contacts from food, the arts and industry is becoming increasingly important and, in many instances, is the explanation for "eczemas" of eight, ten or more years duration.

Quinine and Quinine Derivatives. Quinine is a frequent and, because of its wide use, an important producer of intoxications. Its common-

est type of eruption is a scarlatiform erythema which disappears on pressure. Urticaria, papules, vesicles, bullae, petechiae and other purpuric lesions occur. At times there may be a desquamation resembling that seen following scarlet fever. The lesions sometimes persist for weeks and months and can be exacerbated by emotional excitement, fright, etc.

Patients generally are well aware of their idiosyncracy to quinine as contact with hair tonics, shampoos, cough mixtures, etc., even in minute amounts produce their symptoms. It is important for physicians to question all patients before administering quinine in any form.

Symptoms produced by cinchona and cinchona alkaloids resemble those following quinine. Cinchophen and cinchophen derivatives, which are also known by their proprietary names of "atophan" and "novatophen," in addition to producing erythematous, urticarial and acute exfoliating skin eruptions, are frequently extremely toxic in small doses given for very brief periods with fatal termination in approximately one-half the cases reported. Several patented medicines contain cinchophen and deaths have been reported following their use.

Bromides. Bromides are one of the few drugs which produce characteristic eruptions known as bromadermas. They may appear after one or two large doses or after the drug has been used over a prolonged period and are apt to persist a considerable period of time after it has been discontinued. The most common type of bromide eruption, the bromacne, consists of papular and pustular acne-like lesions located over the face, chest, shoulders and legs. Another variety consists of peculiar raised, crusted, granulomatous masses, variously sized, rounded or irregularly outlined lesions, reddish-brown in color and studded with minute pustular points. Bromides have been prescribed by the unwary physician to relieve the discomfort and pain from the granulomatous lesions produced by this drug with the establishment of a vicious circle. Non-characteristic eruptions as a vesicular rash simulating chickenpox, urticaria, bullae, furuncles and carbuncle-like lesions also occur as a manifestation of bromide toxicity.

Iodides. The iodides are a frequent cause of drug eruptions due to their common use and because a large number of individuals are hypersensitive to them. The lesions closely resemble those produced by the bromides with the most common acneiform or furuncular in type involving the face, neck and shoulders. Nodular lesions may suggest syphilitic gummata and, if potassium iodide is being administered, its dosage may be increased with an aggravation of the eruptions. Vesicular and bullous lesions, which are peculiar to the iodides, are situated on erythematous bases and present dark centers resembling smallpox. These are usually situated on the face, neck and hands and, when the ruptured bullae are replaced by soft vegetating lesions, they may resemble pamphigus vegetans. The mucous membranes may be involved with vesicular and condylomatous lesions or excoriations over the tongue, palate, fauces and gastrointestinal tract. If the eruptions are extensive, they are usually associated with other symptoms of iodism as coryza, pharyngeal catarrh, gastrointestinal irritation and sometimes marked rise in temperature.

Barbital and Barbital Compounds. Barbital and its compounds may produce generalized erythematous or local fixed eruptions. The generalized eruptions are usually morbilliform and scarlatiniform in character with occasionally bullous and erosive lesions on the buccal mucosa and can be accompanied by fever. Medinal, allonal, phenobarbital, veronal, luminal, dial, ipral, amytal, nembutal, etc., are proprietary barbital compounds which are familiar products to the laity and should be considered in determining the source of toxic eruptions. Also, they should be prescribed with caution as sedatives and hypnotics for any acute dermatitis as they may increase or augment the eruption.

Phenolphthalein. The characteristic phenolphthalein eruption consists of erythematous plaques followed by pigmentation. These are termed fixed eruptions as the lesions occur in the same sites each time the drug is taken. Vesicles, erosions or superficial excoriations, when they occur, are usually located in the mouth or on the skin of the genitals. The promiscuous use of patented and proprietary laxatives should be discouraged as many contain phenolphthalein.

TREATMENT

After the diagnosis of a drug eruption has been established or suspected, the treatment is largely symptomatic. The causal drug must be

discontinued at once. Saline cathartics, alkaline diuretics and forced fluids should be instituted. Sodium thiosulfate in one gram doses intravenously followed by intravenous calcium medication, if indicated, is the recognized method for treating arsenical intoxications. The intravenous administration of large quantities of decinormal saline solution benefits iodide and bromide eruptions. Concomitant systemic disturbances as hepatitis, nephritis, etc., when they arise, are serious and usually require hospitalization and appropriate intensive medication.

Local medications are prescribed to increase the comfort of the patient and usually have no effect upon the subsidance of the eruption. They may consist of calamine and zinc lotion, applications of olive oil, dusting with powders, colloidal baths, etc. Continuous saline dressings benefit nodular and granulomatous lesions produced by iodides and bromides. The resistance of the skin to bacterial infections is usually lowered during and following these eruptions and suitable antiseptic washes, ointments and dressings should be instituted when indicated.

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DISCUSSION

J. M. McCuskey, Peoria, Illinois: Dr. Morginson has done well to call attention to the various eruptions that may be produced by the internal administration of drugs. His outline of the method of approach should be quite valuable to those who have not been accustomed to using such a method.

One cannot help but compare the various drug eruptions with those produced by syphilis. Many of the drug eruptions may closely resemble the various syphiloderms but they also possess other similarities. Both present a wide variety of cutaneous lesions and the lesions of both may very closely resemble a great number of dermatological conditions. For this reason it is always of the utmost importance for the physician when examining a patient with an eruption which is obviously of a systemic nature to consider the possibility that this eruption may be due to a hypersensitivity to drugs or to syphilis. The failure to recognize both conditions is often due to the fact that the physician did not think of them.

Of course in a short paper it is possible only to mention a few of the more important phases and to consider only the eruptions produced by the more commonly used drugs. There are a few points that Dr. Morginson did not have time to mention that might be of some practical importance. When attempting to obtain a history of drug ingestion, it is not always sufficient to ask the patient if he has been taking medicine. A question, "Have you been taking any medicine?" may evoke a negative response but if the patient is asked if he has been taking a laxative, a sedative or a tonic, etc., a history of drug ingestion may sometimes be obtained. Again it is possible that a patient may have a drug eruption and may not have taken medicine in any form. Dr. Morginson has mentioned that arsenic eruptions may be produced from arsenic obtained from sources other than drugs. It is well known that nursing infants may develop eruptions from drugs, particularly bromides and iodides, taken by their mothers. Iododerma may be produced by the ingestion of iodized salt. The acneform lesions not infrequently result from iodine obtained in this manner. Phenolphthalein is often present in some brands of tooth paste, in some mouth washes and in the pink frosting used on some cakes. Individuals sensitive to phenolphthalein may develop typical eruptions from the phenolphthalein obtained from these sources.

A patient may be sensitive to both the local application and to the internal administration of a drug. For example, if the internal administration of quinine will produce an eruption in an individual, this same individual may very likely develop a dermatitis if this drug is applied to the skin; for instance, incorporated in a hair tonic. I have seen two patients in whom the local application of quinine produced a dermatitis venenata and the internal administration a dermatitis medicamentosa. Individuals who are sensitive to drugs will almost never develop a positive reaction to the patch test with the notable exception that patch tests may be positive when the drug eruption is of the eczematous type.

Lastly, when administering a drug to determine whether an eruption might be due to this drug, it is important to remember to give a very small dose, usually one that is much smaller than the therapeutic dose. Sometimes quite unfavorable reactions result from even therapeutic doses of a drug given to an individual who is hypersensitive to that drug.

SCOPOLAMINE AND ATROPINE CYCLOPLEGIA

A Comparative Study

LOUIS BOTHMAN, M. D.
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In 1932, I published a comparative study of the cycloplegic effect of homatropine and atropine[1]. This revealed that homatropine had many shortcomings and that atropine was a much preferable drug for use in refraction. Because the cycloplegic effect of atropine lasts for ten days or even longer in many cases, I decided

Read before the Section on Eye, Ear, Nose and Throat, Eighty-sixth Annual Meeting, Illinois State Medical Society, Springfield, May, 20, 1936.

From the Division of Ophthalmology, Department of Surgery, The University of Chicago, Dr. E. V. L. Brown, Director.

1. Arch. of Ophth. 7: 389, March, 1932.

to use scopolamine, whose cycloplegic effect lasts from 60 to 72 hours and compare its value in refraction with atropine. The results of this study made on 237 eyes of 138 patients is presented.

In this series of 138 cases, there were 78 females and 58 males. Of the 237 eyes, 88 were myopic, 119 hyperopic and 30 had mixed astigmatism. These were divided into three age groups. A, contains all cases under 20 years of age; B, those between 20 and 40 years, and C, all over 40 years of age.

Technic. The material presented is taken from the private practice of Dr. E. V. L. Brown and myself, and from the Max Epstein Clinic of the University of Chicago.

The eyes were examined by retinoscopy in the usual manner, making the test from one meter distance using a concave mirror.

The scopolamine hydrobromide was used in 0.5% aqueous solution. Two drops were instilled into the conjunctival sacs at one-half hour intervals and the examination made 15 minutes after the second drop.

Atropine sulphate 1% in aqueous solution was used for 3½ days. The first drop was instilled before retiring on the fourth evening before the examination and repeated four times daily the succeeding three days and at breakfast and lunch time on the day of examination. Patients at the clinic had 14 drops in all and those seen at the office 15 drops.

In 8% of patients, there was a reaction to scopolamine as manifested by dizziness or a staggering gait. A dram of aromatic spirits of ammonia administered orally was sufficient to restore patients having a reaction to normal. Only occasional drowziness persisted after an hour.

tion of the ciliary muscle under atropine. This represents 11.7% of all eyes in the series. It will be noted that these changes occurred in patients in groups A and B—all under 40 years of age. Only one eye in any patient over 40 years of age changed from mixed astigmatism to hyperopia.

In 44 of the 237 eyes there was no change in the power of either the sphere or cylinder. These were divided as follows: 14 myopes all in group B; 25 hyperopes 3 in group A, 18 in B and 4 in C; and 5 mixed astigmatism 1 in A, 2 each in B and C. In terms of percentage 14.7 had the same refractive errors when examined while under the influence of either drug.

There were 238 hyperopic meridians of which 148 had more hyperopia under atropine and 22 had less. Group A had 43 more and 5 less, B had 88 with more and 12 with less and group C had 17 with more and 5 with less hyperopia.

In other words 90.6% of the hyperopic meridians under atropine were stronger than while under scopolamine.

There were 176 myopic meridians in the series of which 92 were weaker while under atropine than when under the influence of scopolamine. In Group A, 24 were weaker; in B, 61 were weaker and 28 stronger (more minus) and in C, 7 were weaker while none were stronger. 87.2% of the myopic meridians were weaker under atropine.

There were 30 eyes with mixed astigmatism under scopolamine and atropine. Table 2 indicates the changes of the spheres and cylinders. Of these eyes 13 showed less sphere (myopia) and more cylinder (hyperopia) under atropine; 3 had less sphere under atropine while the cylinder remained the same. The myopic meridian was less in 76.4% of all mixed astigmatism eyes.

TABLE I. CHANGES IN TYPE OF REFRACTIVE ERRORS

	Myopia to Emmetropia			Myopia to Mixed Astigmatism			Myopia to Hyperopia			Mixed Astigmatism to Hyperopia			Emmetropia to Hyperopia		
Groups	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C
Number of Eyes	1	4	0	0	4	0	2	4	0	2	6	1	0	3	0
Total Number		5			4			6			9			3	
Per cent		4.4%			3.5%			5.4%			8.1%			2.7%	

Data. In Table I is presented the eyes in which there was a change in the type of refractive errors. In 24.3% of the myopic, emmetropic and mixed astigmatic eyes under scopolamine, there was a definite change due to better relaxa-

Table 2 also shows the changes in astigmatism in the hyperopic and myopic groups. In the myopic group the largest figure, 31 in column 9, is that in which less sphere was found with a higher cylinder while in the hyperopic group

columns 5, 6 and 7 are almost the same, i. e. the combination of higher spheres with either a higher or lower or the same cylinder was found with about equal frequency.

The axis of astigmatism was unchanged in 95 eyes (all groups). The change under atropine was less than 15° in 27 eyes and more than 15° in 75 eyes. This latter figure includes the eyes which changed from simple spheres to astigmatism under atropine.

Astigmatism with the rule was found in 76 of 97 hyperopic eyes under scopolamine and 76 of 93 under atropine. In myopic eyes it occurred 31 times in 62 eyes under scopolamine and 35 of 57 under atropine. In eyes with mixed astigmatism it was with the rule in 16 of 26 eyes with scopolamine and 15 of 26 under atropine. For the whole series, 123 times in 185 eyes, the astigmatism was with the rule with scopolamine and 126 times in 176 eyes with atropine.

In the hyperopic group simple spheres under scopolamine changed to hyperopic astigmatism (simple or compound) in 8 eyes and in 8 they remained simple spheres. In 12 eyes which had hyperopic astigmatism errors under scopolamine, the correction under atropine was found to be only spherical.

In the myopic group 13 eyes with simple spheres changed to myopic astigmatism while 8 remained simple spheres. In 6 others the refraction changed from a myopic astigmatism to a spherical correction.

Special note is made of the two eyes which changed from hyperopia to mixed astigmatism and the one from hyperopia to emmetropia. These were outstanding exceptions to the usual findings as were the 5 eyes which changed from mixed astigmatism under scopolamine to myopia under atropine.

Table 3 is almost self-explanatory. Attention is called to the actual difference in diopters found in eyes under the two drugs. The totals show that the difference was only +0.25 diopter in 177 meridians; 0.50 diopter in 94 meridians, 0.75 diopter in 46 meridians and 1 or more diopters in 18 meridians. In only 5 cases was the difference more than 1 diopter. There were 2 in group A hyperopes and 3 in group B myopes. The greatest difference was 1.75 diopters. The average differences for the series in groups is given in diopters. The total was 0.41 diopters increase in hyperopia and mixed astigmatism and 0.43 diopters less in myopia.

TABLE 2. CHANGES IN REFRACTION IN EACH EYE

Group	No. of Eyes	> S	< S	1 S	>S <Cyl	>S >Cyl	>S 1 Cyl	<S <Cyl	<S >Cyl	<S 1 Cyl	1S >Cyl	1S <Cyl	1S 1 Cyl	1 Axis	< 15° Diff.	> 15° Diff.
Myopia A.....	15	..	..	..	..	..	..	2	8	2	..	2	1	5	1	4
B.....	68	2	2	5	3	3	..	4	21	9	4	6	9	14	10	18
C.....	5	..	..	..	..	..	..	1	2	1	..	1	..	2	1	1
	88	2	2	5	3	3	0	7	31	12	4	9	10	21	12	23
Hyperopia A.....	30	1	..	..	4	6	8	1	2	..	4	1	3	14	1	14
B.....	73	4	..	1	18	13	11	..	7	..	4	2	13	32	7	27
C.....	16	..	..	..	2	5	2	..	1	..	3	1	2	11	3	2
	119	5	..	1	24	24	21	1	10	..	11	4	18	57	11	43
Mixed Astigmatism A....	4	..	..	..	..	..	..	..	2	0	..	..	2	2	1	1
B....	17	..	..	..	1	1	0	2	8	3	..	..	2	10	2	5
C....	9	..	..	..	2	1	..	0	3	0	..	1	2	5	1	3
	30	..	..	..	3	2	0	2	13	3	..	1	6	17	4	9
Grand Total	237	7	2	6	30	29	21	10	54	15	15	14	34	95	27	75
Total Myopia %... ..		2.4	2.4	6.1	3.7	3.7	0	3.7	22.2	9.8	4.9	11.1	12.3	25.9	14.8	28.2
Total Hyperopia % ..		4.2	0	0.8	19.3	19.3	17.6	0.8	8.4	0	9.2	3.3	15.1	47.8	9.2	36.1

S = sphere
Cyl = cylinder
> = more
< = less
1 = same

Summary. 237 eyes were refracted while under the influence of scopolamine and again while under atropine and the figures compared.

Myopia. Four and four-tenths per cent, of all myopic eyes under scopolamine were emmetropic under atropine; 3.5% changed to mixed astigmatism and 5.4% became hyperopic.

Sixteen per cent of simple myopic eyes changed to myopic astigmatism and 9.7% remained simple myopia. In 7.4% the change was from myopic astigmatism to simple myopia.

Eighty-seven and two-tenths per cent of all myopic meridians had an average of 0.43 diopters less myopia under atropine. The difference was greater in the youngest age group.

Twenty-two and two-tenths per cent of all myopic eyes had a decrease in the sphere and an increase in the strength of the cylinder.

Every eighth meridian was decreased 0.75 or more diopters.

Hyperopia. Of 238 hyperopic meridians, 72% had an average increase of 0.39 diopters, the highest increase being an average of 0.46 diopters in the group between 20 and 40 years of age.

Of the 88 hyperopic eyes 28% had no change in the strength of either the sphere or cylinder.

Every sixth meridian had an increase of more than 0.75 diopter.

Mixed Astigmatism. Eight and one-tenth per cent of cases of mixed astigmatism under scopolamine were hyperopic under atropine.

Thirty-eight and two-tenths per cent had a weaker minus meridian and a stronger plus under atropine.

The minus meridian was weaker and the plus unchanged in 23.5%.

The minus meridian was weaker in 76.4% of all cases of mixed astigmatism.

Most changes occurred in the 20 to 40 age group.

TABLE 3. CHANGES IN MERIDIANS OF REFRACTION, GROUPS A, B AND C

Group	No. of Cases	No. of Eyes	Meridian	Atropine > Scopolamine	No Change	Atropine < Scopolamine	Difference +0.25	+0.50	+0.75	+1.00	Aver.	Astigmatism with Rule Scopolamine	Atropine	Less Cyl.	More Cyl.	Same Cyl.
Hyperopia																
A	17	30	60	43	12	5	26	9	12	1	>.43	20/24	21/24	6	12	9
B	50	73	146	88	46	12	52	28	16	4	>.46	46/57	45/53	19	21	24
C	8	16	32	17	10	5	14	4	2	2	>.40	10/16	10/16	9	14	12
Total	65	119	238	148	68	22	92	41	30	7	>.39	76/97	76/93	34	47	45
Myopia																
A	10	15	30	0	6	24	7	10	3	4	<.57	3/14	8/10	3	9	3
B	37	68	136	28	40	61	46	32	9	7	<.41	27/44	26/43	15	26	17
C	3	5	10	0	3	7	4	3	0	0	.35	1/4	1/4	2	2	1
Total	50	88	176	28	49	92	57	45	12	11	<.43	31/62	35/57	20	37	21
Mixed Astigmatism																
A	3	4	8	6	2	0	3	2	1	0	>.40	3/4	2/4	0	3	1
B	14	17	34	20	11	3	18	3	2	0	>.33	7/13	7/13	4	2	1
C	6	9	18	0	7	11	7	3	1	0	>.18	6/9	6/9	5	0	4
Total	23	30	60	26	20	14	28	8	4	0		16/26	15/26	9	5	6
Grand Total	138	237	474	202	137	128	177	94	46	18	>.41 <.43	123/185	126/176	63	89	72

CONCLUSIONS

Scopolamine cycloplegia is not as complete as that of atropine. The refractive errors found under scopolamine closely approximates those for atropine, the difference being an average of 0.39 diopters per meridian in hyperopia, 0.43 diopters in myopia and 0.42 for all eyes.

Scopolamine should not be relied upon in cases with good unaided distance vision when myopic or mixed astigmatic errors of refraction are found. Such eyes should be refracted under atropine.

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DISCUSSION

Dr. Ralph H. Woods, LaSalle: Hyperopia is subdivided into absolute, facultative, latent, which is again

divided into tonic spasm and clonic spasm. The only reason for using a cycloplegic at any time is to differentiate definitely between the facultative error and the latent error. A drug that does not give full and complete ciliary relaxation is not the correct drug to use for refraction.

The question arises, how can one tell when complete relaxation is secured? A widely dilated pupil does not of necessity indicate complete ciliary relaxation. One cannot intelligently prescribe for a case of hyperopia without first knowing and differentiating the absolute error, the facultative error and the latent error. There is a way of determining the absolute and facultative errors in a well done manifest, quickly and easily. The appropriate cycloplegic should relax all of the latent errors, thus making a complete differentiation. It is my opinion, based on thirty-two years of observation and experimentation, that a cycloplegic should never be used until the amplitude of accommodation is measured. This procedure is so simple and easy to do that there is no excuse for not doing it.

There are two or three ways to determine whether one has secured complete cycloplegia. The easiest and quickest is with the retinoscope. Working at 40 inches and placing a +1.00 in the trial frame to compensate for this distance, the red reflex should show no different motion with a fixation point at infinity than a fixation point at the working distance, or any other distance; or if using a fixation point at the working distance and moving it toward the eye, and the character of the motion is seen to change, it is then very certain that cycloplegia is not complete.

When atropine has been conscientiously used, according to directions, one may be certain of full and complete relaxation as determined by the above experiment, or other experiments. If scopolamine will answer these requirements then it has an equal rank with atropine. Up to the present time atropine is the only drug that has served my purpose for refraction.

Dr. F. W. Brodrick, Sterling: I enjoyed Dr. Bothman's paper and owe him an apology for not having a better discussion, but I am rather ignorant of the subject because of lack of experience with scopolamine. I will grant that there is a lot to be desired in the action of homatropine as a cycloplegic, and a number of years ago I tried to use scopolamine, but was scared out because of some untoward results, mostly likely caused by not having the punctum closed long enough. After having had several experiences of fainting, staggering, etc., I gave it up. Dr. Lancaster told me I had used the solution in too great strength—0.5%, and later my attention was called to an article by Ball stating that 0.1% solution of scopolamine was quite sufficient to produce cycloplegia and refraction, using one drop the night before refraction, one drop in the morning, and one drop when the patient presented at the office. This has been successful for dilating the pupil for other types of cases, and I have found a fairly weak solution would give sufficient dilatation. I am very grateful for hearing this paper and am sure I shall try scopolamine again.

Dr. G. H. Mundt, Chicago: I have been interested in the use of scopolamine for many years, and have used it for refraction work. It is very difficult to discuss a paper in which there is so much statistical material—it is almost impossible to discuss intelligently a paper of that kind. Remember that scopolamine is a highly toxic medicament; there is no question about that. If you use 0.5% in the eye and repeat it in thirty minutes without due care—and I use due care because we put a very small drop in the conjunctival sac—you will have sometimes more violent reactions than Dr. Brodrick outlined. They will be climbing up the wall. There is no question about its toxicity, but it is a most valuable thing to use for refraction. It is a fine mydriatic. I believe as Dr. Bothman believes that it is a far superior cycloplegic for refraction to homatropine, and I should go further and say that it is almost as satisfactory for refraction as atropine. I should like to ask how long after the scopolamine has been used he uses the atropine. My experience is that it lasts frequently longer than seventy-two hours. I want to say that Dr. Woods is an optimist when he says that atropine when frequently used will completely relax the accommodation. Sometimes it does, sometimes it does not. I am advocating scopolamine for refractions. I am warning about it as highly toxic. I believe it is not safe to give to patients to use at home. It is not safe for anybody but a physician to use.

Dr. Louis Bothman, Chicago (closing): I agree with Dr. Woods that atropine is the drug we would like to use in all cases, but we occasionally run into difficulty with patients who object to being blurred for so long a period. The reason for the use of scopolamine was to learn if it would be almost as satisfactory as atropine. None of my cases had symptoms such as were described by Dr. Mundt, but scopolamine is quite toxic to some patients. If they do have a reaction, a dram of aromatic spirits of ammonia should be given by mouth. Scopolamine is unquestionably a better cycloplegic than homatropine, but it is not as good as atropine. I use it first, and if the relaxation is not satisfactory, use atropine later. When I say I am not satisfied, I mean with such cases that have 20/15 unaided vision which under scopolamine need a myopic correction of ½ diopter or less or even a mixed astigmatism correction. I do not feel that the patient would secure any relief from those kinds of glasses. I may find the same error under atropine. In that case, I feel satisfied because after a rest of a couple of weeks the patient may be comfortable without any glasses. With atropine you get relaxation of the ciliary muscles for a sufficiently long period to relieve the symptoms. We do insist on atropine in all children and all myopes. In other cases we try the other cycloplegic first.

A REVIEW OF ANGINA PECTORIS AND CORONARY DISEASE

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A study of medical literature of the past decade might easily lead to the erroneous impression that the subject of coronary disease has been covered *ad surfeitem*. However, if considered relatively, it has actually been neglected. In the first place, heart disease in its broadest sense has usurped the foremost position as the cause of death in middle and advanced life. Furthermore, the particular form under consideration, coronary disease, displays a selectivity which reaches out and encompasses the mental types of occupation as opposed to the physical, and rather disconcertingly shows a partiality towards our own profession. Note, for example, the figures quoted by White[1] in a recent paper on the subject:

"In 1931, out of 3,000 deaths among American physicians, more than 1,000 were due to heart disease, leading cerebral hemorrhage by 700, and pneumonia by 750. In one week, out of 47 deaths amongst physicians, heart disease was listed in 21, and of those eight were coronary deaths."

The great frequency, therefore, of coronary disease in our own ranks makes this a very pertinent subject. In the second place, it can in no sense be considered a terminal disease, an essential end-result of decadent senility. For, while it is encountered in the later decades of life, it all too frequently descends on the prime of life and blots out virile manhood. Apropos this statement, the following excerpts are quoted from a recent publication by Eppinger and Levine:[2]

"This study concerns 141 fatal cases of angina pectoris. There were eleven men and thirty women, a ratio of four to one. The average age of onset for men was fifty-six and for women 58.1. The average duration of angina was 4.6 years for men, and 4.5 years for women. The average age at death was 60.7 years for men, and 62.7 for women."

We note, therefore, from this and other statistical reports that the bulk of coronary deaths occur early in the sixth decade.

Finally, if we consider coronary disease in its fullest sense, and include the anginal syndrome, it not only calls for no apology, but on the contrary is entitled to intensive research and prolific discussion, for the subject in many of its phases is far from being closed.

A consideration of coronary disease, excluding angina pectoris, would make the subject vastly more simple, but in the same ratio less interesting. Refuting the old axiom that "discretion is the better part of valor," it might be well to take up the matter of angina pectoris at once.

Historically, while this syndrome was recognized centuries ago, and freely and intelligently recorded by many observers, because of its similarity in many respects with coronary occlusion, the entire subject remained muddled up to our present century. In this discussion many important names are deleted, and the following brief historical sketch must suffice: In 1700 Drelincourt recorded what was probably the earliest recognition of coronary sclerosis. In 1768, Heberden gave a vivid description of angina pectoris, limiting his observations to the acute attack.

John Hunter's very intimate portrayal of the disease as occurring within himself followed in 1794. In 1850, Cruveilhier reviewed the subject of coronary thrombosis and brought the existing data up to date. In our own century, Dock, in the latter part of the ninteenth century, contributed a beautiful paper describing coronary thrombosis. It remained, however, for our own Dr. James B. Herrick of Chicago to pave the way, through his epochal paper of 1912, for a clearer understanding and differentiation of the anginal syndrome from coronary occlusion.

In 1914, Mackenzie followed with a contribution emphasizing the part played by the coronaries in angina pectoris. Finally, the work of Sutton and Smith in Chicago, Pardee with his electrocardiographic findings, and Lewis of England have individually and collectively given a great stimulus to the study of both angina pectoris and coronary disease in general.

Etiology and Mechanism of Angina Pectoris: There are subjects more easily and confidently discussed than the mechanism of angina pectoris. It is true that within the past two decades opinion has veered and centered rather definitely on the coronaries, leaving those who hold for an aortic origin in the minority; however, certified proof is still in the offing. It would be well at this point to plagiarize boldly from Dr. Paul D.

1. White, Paul D.: The Diagnosis and Medical Treatment of Angina Pectoris. Ann. Int. Med., 7: 218-228, 1933.
2. Eppinger, Eugene C., and Levine, Samuel A.: Angina Pectoris: Some Clinical Observations, with Special Reference to Prognosis. Arch. Int. Med., 53: 120-130, 1934.

White's excellent paper,[3] which appeared in 1933: *"Types and Causes of Angina Pectoris.* Four weighty arguments that have almost conclusively proved that the symptom (angina) is due to coronary insufficiency are:

"1. That angina pectoris and proved coronary occlusion give the same kind and location of pain.

"2. That angina pectoris is often complicated by coronary thrombosis, or indeed may occur for the first time after coronary thrombosis.

"3. That those cases of luetic aortitis with narrowing of the mouths of the coronaries are the ones that show angina pectoris, while those cases of luetic aortitis which fail to involve the coronary mouth, do not have the anginal syndrome, no matter how extensive the aortic involvement.

"4. Constriction of the coronary artery in the dog produces pain, while distention of the aorta does not. Thus we accept the premise that angina pectoris is caused by temporary coronary insufficiency and is *not* of aortic origin."

Accepting without hesitation the premise that the anginal syndrome is directly due to an anoxemia of the heart muscle, in turn due to a coronary insufficiency, we are next confronted with the cause or causes for this insufficiency.

Sclerosis of the coronary arteries, with a consequent loss of elasticity and a resultant narrowing of the lumen, certainly explains the vast bulk of anginas encountered in the later decades of life. Furthermore, the not too occasional anginas in early life are frequently due to the encroachment of luetic aortitis on the coronary mouths. There remains, however, a very appreciable group of fatal anginas, the explanation and mechanics of which are not so clear. I cannot accept as logical the fairly popular theory of a spasm or vasoconstriction of brittle, pipe-stem coronary arteries so complete as to result in fatal heart muscle anoxemia. In other words, I can conceive and readily accept that a calcified, narrowed coronary channel, through its diminished current brings about the anginal syndrome in its entirety—all except its most dramatic climax, death—that to me is not feasible.

Differential Diagnosis of Angina Pectoris and Coronary Occlusion: The diagnosis of angina pectoris is, as a rule, simple. It must be based upon either an intelligent story or the actual observation of a seizure. Physical signs, both preceding and following an attack, are notoriously unreliable or absent. The laboratory offers no help except possibly, in some instances, suggestive electrocardiographic changes. Fortunately, however, an acute attack of angina pectoris presents an unmistakable picture which can hardly be missed or confused. So widespread is the knowledge concerning this event that the subject very frequently arrives at his own correct diagnosis without the advice of a physician. It seems futile and all too elementary to recount even in rapid order the incidents of an attack as follows:

A strangling sensation or sense of extreme oppression, substernal, brought on by physical effort, less frequently by an emotional explosion and rarely while at complete rest. The seizure is of brief duration, lasting a variable number of seconds or minutes and, unless terminating fatally, is unassociated with an appreciable degree of shock. Occasionally, but I feel far from regularly, the outstanding sensation of strangling gives way to substernal pain radiating to the shoulder and possibly the upper arm. While the diagnosis of angina pectoris is relatively simple, its differentiation from coronary occlusion is all too frequently confused. This is unfortunate, since both the management of these two conditions and the prognosis differ radically. While they have much in common as regards etiology, and possess symptoms that are closely related, they nevertheless display ample individuality to render an accurate diagnosis possible in the vast percentage of instances.

Points of differentiation are:

ANGINA PECTORIS	CORONARY OCCLUSION
1. Substernal strangling or pain. Brief duration—seconds or minutes.	1. Hours.
2. Brought on by physical effort almost always. (Exceptions are chiefly: Emotional explosions and nocturnal attacks due to gastrointestinal upsets.)	2. Physical effort not essential. Frequently occurs while at rest.
3. *Symptoms of shock*—absent.	3. *Symptoms of shock*—constantly.
4. Gastrointestinal complications rare.	4. Vomiting and abdominal pain frequent.
5. Physical signs (cardiac) *meager or absent.*	5. Physical signs, that is rapid, feeble pulse, weak heart tones—frequent.
6. Rapid relief and return to normal with nitrites.	6. No relief.
7. Temperature normal.	7. Elevation.
8. Leucocytosis absent.	8. Present.
9. Electrocardiographic changes variable and negligible.	9. Coronary T-wave (of Pardee) and evidence of myocardial infarction.
10. Pericardial friction rub absent.	10. Frequently present in 48 hours.

Prognosis: It has been pointed out that the differential diagnosis of angina pectoris from

3. White, Paul D.: The Diagnosis and Medical Treatment of Angina Pectoris. Ann. Int. Med., 7: 218-228, 1933.

coronary occlusion affects vitally both the prognosis and management. It would seem all to elementary to recant that the former (angina pectoris) is but a syndrome which may occur and recur frequently, the patient in the interim not only enjoying good health, but in no wise incapacitated for work. Coronary occlusion, on the contrary, is always a serious event, not only entailing a high mortality but, if going on to recovery, resulting in permanent disability to an appreciable degree. However, a few thoughts are in order concerning the individual prognosis of both conditions.

In regard to angina pectoris, I feel we have become to lugubrious and pessimistic. Note, for example, the following quotation from a paper by Cotton:[4]

"The average anginal patient is likely to die within five years from the outset of symptoms," etc.

Or, again, we find the following statistical figures presented by Eppinger and Levine:[5]

"This study concerns 141 fatal cases of angina pectoris. The average age of onset for men was 56, and for women 58.1. The average duration of angina was 4.6 years for men, 4.5 years for women. The average age at death was 60.7 years for the men, and 62.7 for the women."

It seems unnecessary for me to state that I do not challenge the accuracy of these figures nor the results. It strikes me, however, that possibly these subjects were either not under continued and close observations or could not or did not live up to prescribed management. In other words, my own experience leaves me more optimistic in the matter of life expectancy in anginal subjects. I feel theirs is a happier and more cheerful lot.

If next we turn to Mackenzie's book, "Angina Pectoris,"[6] we read as follows:

"Concerning a series of 147 patients with angina pectoris. One man lived 31 years after his first attack, three lived twenty-five years, one twenty, seven more than fifteen years, and twenty-one for more than ten years. Thirty-three lived more than ten years and at the time the book was written, sixteen were still alive. Many of these patients, too, lived useful lives. Eight physicians continued to practice, others traveled, etc."

As regards my own observations and experience, I am unable to support my optimism with impressive statistics. My files, however, reveal seven individuals with angina pectoris of more than ten years' standing and eleven of over six years. All are in reasonably good health and fairly active both physically and mentally.

When we approach the subject of coronary occlusion, however, our optimism wanes. Here, of a fact, is a grave and serious situation. The prognosis is influenced by various factors, notably, the age and general condition of the individual, the location, area and extent of cardiac infarction. The immediate outlook is most serious, since a fatal result will probably occur within the first few weeks. After that period, under conservative management, the prospects brighten. It has been stated,[7] "a second attack is relatively infrequent," etc. While this may have some substance, it will offer only little consolation to the individual who has weathered his storm. After all, his myocardium bears mute testimony of the previous insult. The area of the heart muscle replaced by fibrotic tissue must ever remain a source of potential rupture. Possibly every third individual will succumb to and during his acute attack, another third will survive for several years, and the remaining third live on. That third individual, however, gives us no great solace or joy. Unlike the anginal individual, he has been mortally wounded, and his life is more or less in jeopardy. If that statement seems too melancholy then, at least must we admit that his activities, both physical and mental, must be sharply restricted. If he builds about himself a protective wall, and walks in cloistered seclusion, then life goes on. All too seldom, however, is that practical save in fancied Utopia. Exceptions there are to prove the rule; individuals who regain full capacity and live out their expectancy. Even those few, however, accomplish this result through moderation and conservation.

Treatment: The treatment of angina pectoris concerns itself with the acute attack and the interval between seizures. Just as the former is more dramatic, so is its management more spectacular. However, while it may sound paradoxical and even heretical to many, I am convinced that not only are we able to afford the individual vastly more constructive assistance during the interval, but I am even inclined to believe he can

4. Cotton, T. F.: Brit. Med. Jour., 1: 368-370, 1932.

5. Eppinger, Eugene C. and Levine, Samuel A.: Arch. Int. Med., 53: 120-130, 1934.

6. Mackenzie, Sir James: Angina Pectoris: A Plea for Greater Optimism in Prognosis. Quoted by T. Stuart Hart, Amer. Heart Jour., 8: 755-760, 1933.

7. Parkinson, J.: Coronary Thrombosis. Brit. Med. Jour., 2: 549-553, 1932.

fairly safely, with greater distress it is true, pilot himself through his acute emergency unaided. In the first place, the knowledge of the symptom-complex of an acute seizure of angina pectoris, and the few and homely methods of combating it quickly and effectively, have attained such catholicity amongst lay people that the average individual is able to cope with the situation, particularly after a primary attack.

In the second place, I feel convinced an uncomplicated seizure of angina pectoris rarely results fatally. The explanation of the occasional sudden demise is problematic, but may well be an occult or at least undiscovered occlusion of a coronary filament. The average attack ceases as quickly as it appeared, and leaves the individual none the worse for his experience and that, too, with or without treatment. This statement can scarcely be construed as encouragement for self-management of a seizure, or a belittlement of its seriousness. It is merely intended to emphasize the dual point, that an acute attack is more or less self-limited, and that proper management of the interval is far more essential to the individual. However, few incidents in the travail of human suffering are more agonizing than an acute angina. This pain and strangling, due to a heart muscle temporarily pauperized of blood, are relieved quickly and effectively by postural rest and nitrites. Standing or sitting are preferable to lying, a circumstance which the individual with recurrent nocturnal seizures early appreciates. Sodium nitrite, gr. 1/100, used sublingually is less distasteful than the pungent amyl nitrite pearl, is just as effective and more readily adaptable. It affords relief almost instantly, but if carried as a prophylactic must be renewed at frequent intervals. So brief and simple is the management of the average anginal seizure. In elderly individuals there may be an after-clap in the form of subjective heart manifestations due to this temporary assault. They are, however, usually short-lived and respond to rest.

It would be difficult to visualize an individual who could demand, and in turn receive, more from an able, conscientious physician than the coronary patient. He, of a fact, places his life and his future in his advisor's custody. If he chooses wisely and cooperates fully and intelligently, his outlook is cheerful. He must accept the keynote of moderation—moderation in things physical—work, exercise, play, food and drink. He will agree to a mental rehabilitation, the renouncement of worry, fear, anger and excitation. This by no means calls for curtailment of activities to the point of incapacitation. Quite the contrary, the anginal patient can with safety lead an active life. He must, it is true, taper down and make sundry sacrifices. The average sensible individual, if properly instructed, will be willing enough to meet these demands of safety. After all, man in his later years of life, particularly if he enjoys reasonable health and the use of his faculties, wants to live. As we slip into the third epoch of life, we live largely in the retrospect. We enjoy a kaleidoscopic review of the past. Old age muses wistfully on youth, irretrievably gone. Even the memories of toil in the heat of the noonday sun are, to the aged, sad but sweet. And so, in consolation, old age looks hopefully forward towards a setting sun and a calm and lengthening twilight. This exodus is possible to the anginal patient through moderation and self-denial. Strenuous work, exercise and play alike are dangerous and forbidden. The types, degree and extent of activity allowed vary with the individual. One is permitted a full eighteen holes of golf, for example; another dare not play at all; neither may play on a hilly course or in inclement weather. The safest criterion is the appearance of fatigue, which must always be avoided. Hours of rest must be prolonged, from the customary eight at night to ten and, when feasible, an afternoon rest period added. In the matter of food, quantity is far more important than type. In the absence of contraindications, a diet may be general, but should be bland and frugal. Of really major importance is the insistence upon a limited and simple meal at night. Many a nocturnal seizure of angina pectoris can be directly traced to a gastric debauch. Alcohol and sundry stimulants in moderation are indicated, in excess are potentially dangerous.

A mental readjustment is almost as essential as the physical. The individual need not develop an apathetic attitude towards life and its problems, but it is important that his perspective become tolerant, broad, aye, lackadaisical! He must understand that mental unrest may be his undoing, and must yield to calm and poise.

In the matter of the use and value of drugs in the management of the interval between anginal attacks, I have arrived at a definite stand,

contrary opinion notwithstanding. I feel that both the vasodilators (theocin, theocalcin, diuretin, etc.) and digitalis as well, are not only safely indicated, but very valuable and effective. Support of the former group will probably pass unchallenged, because of almost universal agreement. It is with digitalis that we are chiefly concerned. Many there are who hold that this drug must be considered warily, not only in coronary occlusion but in any degree of coronary disease, which *ipso facto* includes angina pectoris. Note, for example, excerpts from the splendid work done by Gilbert and his associates.[8]

"While a vasoconstrictor action cannot be predicted in any case, we feel that there is enough evidence of the presence of such an action to warrant a great deal of caution in the use of digitalis in coronary disease."

"*Conclusion:* In a series of experiments on dogs evidence was elicited indicating that digitalis bodies may exert a vasoconstrictor action on the coronary arteries."

As for me, I must accept the subjective and objective reaction of the anginal individual to digitalis as my criterion. If that be, as it actually is in the vast majority of instances, increased strength, lessened fatigue, absent or diminished heart symptoms of sundry varieties and, objectively, unmistakable evidence of improved heart tonus, then is the use of this drug vindicated.

A few brief statements concerning the management of coronary occlusion will suffice to close the subject. Sudden closure of a coronary vessel is as grave a situation as it is dramatic. Therefore it demands prompt, unyielding and thorough handling. Complete and absolute physical and mental rest is essential. It must be instituted *at once* and last . . . three months! Because six weeks suffice for the average coronary insult, does that justify the none too infrequent sudden deaths due to inadequacy? In repetition, man has an inherent desire to prolong his life and postpone death and will sacrifice three months to attain his objective.

The narcotics (morphine particularly) play an important part in accomplishing this desired complete relaxation. However, because of the protracted time element, the danger of habit formation must be borne in mind. It must be used judiciously, and the individual weaned at the earliest opportunity. The administration of digitalis in the presence of a fresh infarction is fraught with uncertainty and danger, and is surely restricted to a dire emergency. The three months' rest period will blend cautiously with passive and later graded active exercise. A too sudden transition from rest to activity explains many coronary deaths.

And finally, in conclusion, the stricken individual who senses beyond any other incident in his past life that he has truly approached the chasm's brink and been snatched back needs moral support and encouragement as much as scientific guidance. If the sun is to shine for him again, then must we dispel the clouds and his fears and uncertainty must yield to courage and optimism.

30 North Michigan Avenue.

8. Gilbert, N. C., et al: Effective Digitalis on the Coronary Flow. Arch. Int. Med. 50: 668-683, 1933.

THE OPHTHALMOSCOPIC SIGNS OF FAILING HEALTH

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The age of specialism in which we live tends to develop one sided individuals. The old saying that the specialist knows more and more about less and less, seems on occasion to be justifiably applied to the medical profession. New discoveries, new applications of old facts and realignments tending to greater medical and surgical efficiency are recognized by physicians and by the laity. And yet, there is an inclination on the part of all to become more engrossed in the particular isolated field in which they live or practice to the exclusion of the great broadening forces which surround them. Ophthalmologists are not immune, and this is to be regretted, for ophthalmoscopy is the common ground on which all departments of medicine may gather for the elucidation of their daily diagnostic problems.

This address will be devoted to a restatement of common, everyday observations, a review of some of the fundus conditions the symptoms of which may or may not have been recognized by the patient as an incident to failing health, which for our purpose may be defined as a decrease in mental or physical efficiency.

As patients come to us because of headache more often than for any other symptom, it is therefore, one of the most important subdivisions of the discussion. The frontal, occipital, parietal, temporal and vertex pains caused by uncorrected refractive errors or muscle anomalies

will not be included in this presentation, nor will the acute inflammatory changes in the eye or appendages, with the exception of the cursory mention of orbital inflammation.

When the optic nerve is impinged upon in its course through the orbit, the compression may lead to a papilledema, which is frequently characterized by an exudate along the major vessel trunks, by marked narrowing of the retinal arteries and great distention of the retinal veins, an edema involving the retina and nerve-head producing oblique retinal folds, or in the presence of a large, firm intraorbital mass, distinct retinal ridges. Such fundus changes should be searched for whenever there is external evidence of orbital disease.

The public is sinus conscious, in fact often in a state of hypersensitiveness. To them a pain in the head means the infection of sinus and sometimes it seems that the attending medical man assumes that the patient has made a correct diagnosis and treats him accordingly, although often the sinuses are unaffected and an ocular disease is the cause of the discomfort. When there is an actual pathological process in the frontals, the ethmoids, the sphenoids or the antra, the optic nerve may show inflammatory and edematous changes. This subject has been presented repeatedly, sometimes reflecting the bias of the reporter. Innumerable cases are on record where after the removal of the septic foci, or the mere shrinking and aeration of the sinus there is relief of pain and restoration of vision. But even in these favorable cases we are not justified in considering that the nasal condition was the only etiological factor for time has proved to every ophthalmologist who has had sufficient experience with this type, that although the application of adrenalin to the nasal mucosa is followed by rapid symptomatic relief, some months later there is a recurrence of the scotoma and the appearance of symptoms which change the diagnosis from a nasal lesion to multiple sclerosis. We should, therefore, be very guarded in our prognosis and remember that multiple sclerosis causes at least fifty per cent. of all retrobulbar neuritis cases, and that if patients are observed over long periods, I believe that the percentage will be found much higher. The fundus appearance is quite characteristic, and although with the older ophthalmoscopes the edema of the retina and nerve-head was not frequently discovered or recognized, with the newest instruments it can be found in practically every one shortly after the onset of symptoms. Later the edema subsides, and in the pronounced case the temporal pallor of the disk becomes the dominant fundus sign.

In retrobulbar neuritis following the ingestion of certain drugs a similar edema is also evident although seemingly less intense in degree. The use of thallium as a depilatory has produced the same fundus changes, impaired visual acuity and field defects.

Acute cerebrospinal meningitis may cause congestion of the fundus, dilatation of the retinal veins, retinal edema and papilledema. When a patient complains of headache, has a fever and intense photophobia, the probability of meningeal irritation, usually an inflammation, should lead to the exclusion of meningitis before other diseases are considered. In meningitis actual choked disk is seemingly rare, but secondary atrophy with pallor of the nervehead is seen often enough to place it among the possibilities.

The fundus changes in tuberculous meningitis are usually those of the typical miliary lesions in the choroid, but may include retinal edema and papilledema.

Lethargic encephalitis is frequently ushered in with an attack of diplopia for which the ophthalmologist is consulted. The fundus lesions are few. The congestion of the disk with some edema is the usual picture and when the acute stage subsides the edema disappears and usually vision is unimpaired.

The headache from an intracranial aneurysm is most often frontal, one sided, and if the process is long continued causes a unilateral ptosis. The fundus picture is not pathognomonic. There may be no alteration in the retinal vessels, the veins may be engorged, the arteries small, or both veins and arteries contracted. An aneurysm may compress the optic nerve and cause not only atrophy, but also a large glaucomatous excavation. In marked cerebral sclerosis, the retinal vessels may show little deviation from normal.

In pulsating exophthalmos, either spontaneous or traumatic, there may be a great variety of changes. In the spontaneous type the fundus picture is generally that of senile atrophy with narrow arteries and veins. In the traumatic group, the fundus is often practically normal, although at other times there is an engorgement

of all the vessels with edema of the retina and occasionally the fluid is strictly limited to the disk, a papilledema. The characteristic pulsation of the eyeball and the typical bruit transmitted over orbit and head are enough to establish the diagnosis. When the common carotid artery is ligated to cure the disease, there may be an extreme edema of the retina, retinal hemorrhages and greatly distended veins with sufficient compression of the nerve to lead to subsequent atrophy, with the picture of white disk and attenuated vessels.

The fundus in exophthalmic goiter presents no distinctive pattern. If the thyroid involvement occurs from the fourth to the sixth decade, and if it has persisted for some time definite retinal, arteriosclerosis is found. Occasionally a typical hypertensive fundus is discovered. The malignant type of exophthalmic goiter, where the eyes begin to protrude after the removal of the thyroid, and where nothing seems to check the progressive proptosis, has always been considered serious and has led to many operative and mechanical measures for its relief. During the stage of advancing exophthalmos the optic nerve and surrounding retina become greatly swollen, wide elevated folds appear in the retina, both the veins and arteries are dilated and the vision is greatly impaired. When the orbital pressure is reduced, such as for example after a Naffziger operation the retinal edema subsides, the retinal circulation is restored to normal and unless the compression of the optic nerve has been too prolonged, function is restored. The end result depends upon the degree of secondary optic atrophy.

Headache accompanies all fevers. Its duration and location are sometimes dependent upon the cause. When typhoid fever was prevalent the primary symptom was frequently an intolerable headache. Fortunately, the disease is now rare in our part of the country. Another fever to which the general term brucellosis is applied has taken its place. This is widespread and seems to be increasing so rapidly that ophthalmologists must become familiar with it. An irregular temperature with general malaise and periods of regression in an otherwise seemingly healthy patient suggest the necessity of making a blood agglutination test. Most patients show nothing characteristic in their fundi. One with severe brucellosis had multiple ruptures of the choroid with great reduction in vision. This was a very instructive case because the patient denied having had any serious accident. He said a speck of the corrosion material about a battery terminal had blown into his right eye and caused poor vision. And as absurd as it must seem to you, a physician went on the witness stand and swore that the fundus change was the result of this acid, although it had not caused any inflammation or left any scar even on the conjunctiva. Incidentally, when we criticize the members of other professions, we should not be unmindful of those in our own who live within the shadows of suspicion.

Arachnoiditis, whether traumatic, spontaneous or directly attributable to an intracranial infection, causes a severe headache. As the collection of fluid is frequently so located that it causes a true papilledema, it is well for us to be alert and carefully observe the changes in the fundus. In the typical case of intracranial involvement, there is an extreme papilledema, often characterized by massive exudates along the course of the blood vessels, particularly in the region of the nerve-head. When the pressure is relieved the edema subsides and unless the process has been too protracted the recovery is complete, both function and fundi return to their former normal state.

Edemas of the brain are among the most ordinary pathological causes of headache. Considerable time could be spent on the analysis of individual cases, the correlation of signs and symptoms and the variations in the appearances of nerve-head, but we must be content to call attention to only a few examples, particularly those which involve the pituitary gland where the changes in the fundus are frequently very slight and may be overlooked. There is practically always some edema of the nerve-head. Sometimes this can only be recognized with a narrow beam of light and by the contrast of red, green or yellow lights. The color of the disk has received much attention and as color interpretations are to a certain extent the result of individual experiences, it is the least trustworthy of any fundus sign.

When the pituitary is enlarged, and the chiasmal pressure continuous for a long time, there is a definite waxen pallor of the disk. If the growth increases there is a true atrophy of the nerve fibers, and the nerve-head becomes white.

Fortunately, in all brain tumors, the careful examination of the function of eye, central vision

and field will disclose other signs which can be correlated with the fundus appearance to make the diagnosis certain. Papilledema is of many types.

The diseases which we have mentioned up to this time are not rare, and yet not as frequently observed as hypertension or arteriosclerosis. So many articles have appeared on hypertension that I hesitate to add to the literature, and yet I feel that we can establish the hypertensive fundus changes if we disregard stages or degrees as distinct demarcations or definite delimitations. The separation of hypertension into four stages was a most admirable and practical method and even today has its use, but the clinician must not fail to recall that hypertensive changes are engrafted on normal fundi, and that no two eyes are alike. It should be obvious, therefore, that the signs of hypertension, especially the earliest ones, must differ just as the background on which they appear varies. There is little if any question but that the first sign of hypertension is an edema. This may, as we have said in relation to optic nerve changes, be so slight that it escapes the attention of the examiner. The fullness of the vessels is comparative, and unless the patient's fundus has been seen on previous occasions, it may be difficult to tell when the fundus vessels first show evidence of increased blood pressure. All ophthalmologists are agreed that as the pressure increases the artery becomes more taut, pushes the vein to one side, slightly indents the vein or even compresses it, that synchronously thicker patches of edema appear as snow-bank opacities in the retina with delicate striate hemorrhages.

As the hypertension continues the edema becomes greater, the snow-bank opacities more numerous, the hemorrhages larger, with exudate about them and the blood vessels show an increase in reflex and indentation. Later dark brown more or less granular areas develop in the deep retina about the posterior pole. These are of very great clinical and prognostic significance for they seem to come just before the patient enters the terminal stage in which the retinal edema and the snow-banks often almost disappear, and the hemorrhages become decidedly fewer.

Some patients take more than twenty years to complete this cycle while others pass through it to a fatal termination within a few months.

Every hypertensive will have arteriosclerosis if he lives long enough. Whether this sclerosis is the result of spasm of the arteries or whether it follows a patchy alteration in the vessel is still discussed by those most competent to elucidate the changes. Arteriosclerosis in itself may be evident in the fundus as a single isolated white spot. The plaques may increase in number and extent, and form in vessels of various sizes. The entire vessel wall may be atheromatous; hemorrhages and exudates may form and complete the picture. Fundus arteriosclerosis may suggest the condition found within the skull, but it is by no means to be interpreted as an indication that the vessels in both are similar. Everyone knows that the background of the two eyes may be dissimilar. Most writers on ophthalmoscopy fail to distinguish between the hypertensive fundus and the arteriosclerotic fundus. The reasons for this are obvious, for the conditions encountered are often most confusing, and the case which starts as a frank hypertension soon becomes an arteriosclerosis with hypertension. Then again the changes which take place in the fundus of a patient suffering from nephritis vary from the typical macular star exudate with moderate retinal edema to those in which there is very little exudate and only changes in the caliber of the blood vessels. The differentiation between hypertension arteriosclerosis and nephritic retinitis can in the majority of cases be made. Some authors state that when we have arteriosclerotic changes in the fundus with low blood pressure, it is an indication that the pressure has been high, but this really does not seem to be a justifiable conclusion in all cases for many patients are examined who have no myocardial degeneration and yet the arteriosclerosis is advanced.

We could spend the evening discussing blood vessel alterations but we must pass to other conditions, and for a moment consider failing health as evidenced by nausea and vomiting. First we will consider pregnancy. The fundus changes which indicate a toxemia may be slight, consisting of artery spasm, or they may be intense with extensive exudate, large hemorrhages, great engorgement of the vessels and considerable reduction in vision. The ophthalmologist must play an important role in advising treatment for the prevention of fatal or damaging toxemias in pregnancy. He must recognize the early signs and must observe the patient repeatedly, so that

if the spasm of the artery is frequent, and more prolonged with an elevation in blood pressure he should advise emptying the uterus. If he does not a severe type of retinitis may develop which may be so marked as to lead to detachment of the retina, and call for an immediate Cesarean section. The wise obstetrician always has associated with him a competent ophthalmologist and together they make the decisions which not only save the life of the mother and child, but also preserve the sight of the patient.

After the hypertension of pregnancy is once established, the blood pressure seldom if ever returns to normal, so that the toxemia may not only cause the loss of the baby, but also undermine the health of the mother.

A sudden attack of nausea and vomiting may be the onset of an acute congestive glaucoma. Mild recurring spells may be brought about by chronic glaucoma due either to neglected iritis, uveitis, retinal detachment or an unchecked congestive attack. When the media is clear the distinctive excavation of the optic nerve is readily recognized.

Another state in which these prostrating symptoms may be found is acute alcohol poisoning after the general symptoms subside and it is apparent that the patient is partially or completely blind. Following the exposure to x-rays for the destruction of a malignant growth, a patient may become toxic. Under such conditions the fundus frequently shows hemorrhages, exudates and edema, and occasionally looks exactly like the well known picture of malignant endocarditis. In the terminal stage of pancarditis, nausea and vomiting may also supervene. When patients suddenly discover that they are blind in one eye, they frequently have an attack of nausea and vomiting. This has been observed in embolism and in thrombosis.

Failing health may be the result of an unsuspected or inadequately treated syphilis. The manifestations of this disease are so numerous, and the inauguration of symptoms so capricious, that we can best illustrate it by means of the photographs to show early choroidal changes, the so-called pepper and salt fundus; the extensive disseminated choroiditis, the optic neuritis, the optic atrophy of locomotor ataxia, the migration of pigment into the perivascular sheaths, and the arteriosclerotic closure of some of the larger retinal vessels. The innumerable ways in which this disease expresses itself in the fundus is a constant source of wonder.

Loss of weight may be the only reason why a patient seeks medical help. Diabetes is frequently seen in practice yet its very prevalence seems to delay the diagnosis and lead to confusion in its treatment. There are some outstanding facts regarding diabetes which should form the foundation on which recommendations are made. With the exception of lipemia retinalis a child does not show fundus changes even when the diabetes is extreme, long continued or fatal. Many adults may be emaciated as a result of chronic diabetes and have no fundus changes. A single flame-shaped hemorrhage may be the sign which attracts attention to the metabolic upset. The so-called diabetic retinitis is distinguished by yellowish deposits irregular in outline and in thickness scattered about the posterior pole. They disappear under proper dietary and insulin treatment. Arteriosclerosis, hypertension and diabetes are combined so often that the fundus picture is one of increased artery stiffness and visibility, compressed retinal veins, soft exudates and innumerable flame-shaped and rounded hemorrhages. Some observers believe that this picture is sufficiently distinctive to warrant the diagnosis of diabetes without any urine or blood examination, but this, I believe, is presuming too much. The fundus is a most sensitive indicator of the efficiency of the dietary and insulin treatment. Many times we have seen patients who were said to be under complete control, when in reality they had new exudates, fresh hemorrhages and definite progression of all the fundus changes. It is well to remember that sudden loss of vision may be caused by a macular hole as well as retrobulbar neuritis.

The change in weight which follows thyroid affections is well recognized, and as we said before, the alterations in the fundus are suggestive but by no means diagnostic.

The most common cause for loss of weight is tuberculosis. The changes in the fundus have been well described, and many drawings have illustrated them. The isolated tubercle of the choroid gives a curious reflecting sheen which probably is not found in any other choroidal lesion. As the tubercle enlarges the border remains undefined, and even after healing has taken place there is little migration of the pigment about the patch. Tuberculosis of the choroid

shows a tendency to recur. A tubercle may form near the old one or may be remote from it, but no matter how often there is a recrudescence, the individual lesion goes through the same process of increased opacity and regression with little permanent pigmentation except in the large, single conglobate tubercles where the border is densely pigmented and the destruction of the choroid and the retina so complete that the sclera is seen through the scar. Perhaps the most difficult tubercle to diagnose is the very large one which occurs in children. It has a smooth white surface with an occasional soft yellowish overlying mass and which, because of the age of the patient and the difficulty in making a detailed fundus examination may lead to the erroneous diagnosis of glioma of the retina. The recurring hemorrhages in the vitreous which are part of early ocular tuberculosis may at times be very perplexing. For instance, they may appear in a patient who has tuberculosis and who is also allergic, or they may come in one who seemingly has no tuberculosis, and yet suddenly dies of tuberculous peritonitis.

And, finally, the loss of weight in malignancies. Sarcoma of the choroid may first become evident as a small isolated more or less rounded dark elevation which enlarges pushing the retina forward, and may either cause radiating wrinkles in it or detachment of it. These conditions are too well known to need further reference. Occasionally the eye may be the site of a metastatic growth rather than of the primary tumor.

Two rare fundus conditions, one angiomatosis retinae, and the other angioma, are illustrated to draw attention to their dissimilarities. In angiomatosis a hasty examination may lead one into error for at some time during the disease the appearance may be that which has often been described as pathognomonic of Bright's. However, a careful study of the fundus will always reveal the presence of one or more definite angiomas to which an entering artery can be traced and from which the draining vein can be followed. The other condition, angioma, may cause an immense enlargement of the retinal vessels and make a picture that is so striking that once seen it can never be forgotten or misdiagnosed.

As ophthalmologists we are bound to the great group of physicians who are interested in the preservation of health and the recovery from disease. We are not and must never be segregated from that body, but must make every effort and utilize every opportunity to become more familiar with the advances in the healing art and be prepared to render opinions based on the knowledge and understanding of medicine. We must always remember that although we are concentrating our attention upon the eye, that that organ is part of the body reflecting the conditions found therein. And, further, that the delicacy of the retinal vessels and the appearance of the end of an important nerve places us in a position to interpret many of the signs of general diseases but that our explanations can only be correct if we maintain our contact with general medicine.

United as a profession we progress, isolated as specialists we fail.

344 State Street.

CLINICAL EXPERIENCE IN THE TREATMENT OF ARTHRITIS WITH MASSIVE DOSES OF VITAMIN D

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Introduction. Chronic arthritis is recognized today as the most important economic problem that a chronic disease presents.

Accurate statistics are lacking in the United States. A house to house survey in the state of Massachusetts revealed more chronic arthritis in that state than cancer, tuberculosis and heart disease combined. It has been estimated that there are over three million chronic arthritis patients in the United States. It is listed as "Public

Arthritis Clinic, Research and Educational Hospital, and Department of Medicine, College of Medicine, University of Illinois.

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At various stages this investigation has been supported in part by grants from Mead Johnson and Company; the Graduate School Research Fund, University of Illinois; the American Academy of Arts and Sciences; the Wisconsin Alumni Research Foundation; the Committee on Therapeutic Research of the American Medical Association; the Phi Rho Sigma Medical Fraternity; and the Nutrition Research Laboratories.

Vitamin D preparations used include:

1. Viosterol (1,000,000 units per gram) supplied by Mead Johnson and Company, Winthrop Chemical Company, Parke Davis and Company, Abbott Laboratories.
2. Calciferol supplied by Mead Johnson and Company, Winthrop Chemical Company, Glaxo Laboratories.
3. Drisdol, supplied by Winthrop Chemical Company.
4. A solid preparation known as Ertron, supplied by Nutrition Research Laboratories.

Health Enemy No. 10" by the United States Public Health Service.

Due to the many divergent theories as to the causes of arthritis, various forms of therapy have been suggested and while the literature is full of enthusiastic reports about specific forms of therapy for arthritis, the general program of treatment accepted by all those interested in this disease differs very little. It is rather the combination of many procedures, every observer having his own opinion as to which factor is the most beneficial. It is with this in mind that we are presenting a program of treatment for arthritis in which vitamin D therapy is stressed.

Types. Much has been written on the types of arthritis. The American Committee for the Control of Rheumatism has adopted the classification of atrophic arthritis (rheumatoid) and hypertrophic arthritis (osteo-arthritis). While one may agree with the significance of this anatomic pathologic classification, it is of limited value in so far as treatment is concerned. Most observers agree that chronic arthritis is not merely a disturbance of the joints, but it is a generalized systemic imbalance. Certain it is that not only are both types of arthritis coexistent in the same patient, but even in the same joint. It may perhaps be asked whether the hypertrophic form is not merely a continuation of the atrophic—or that the atrophic ends at the age when the hypertrophic begins. Realizing that both types of arthritis have a common denominator in their manifestations of vascular, nervous, gastrointestinal and locomotor disturbances, and that each type perhaps reacts to a certain stimulus at a given age, it would be a very narrow point of view to assume that one drug or one form of therapy would benefit the arthritic of one type and would be contra-indicated in the other type. Arthritis in the broad sense is a systemic disorder and the treatment must be directed to correct this constitutional imbalance.

Treatment. From the foregoing statements it is evident that any management of arthritis should have for its purpose the re-establishment of the physiologic balance of vascular, nervous, gastrointestinal and locomotor functions.

In the Arthritis Clinic we have divided the treatment into two phases: constitutional and local. The procedures along the line of constitutional treatment are as follows:

1. Massive doses of vitamin D.
2. Rest.
3. Regulation of diet.
4. Correction of bowel habits.
5. Removal of foci of infection.
6. Medicinal care.

Massive Doses of Vitamin D. It should be stated at the start that we have never contended that vitamin D is a specific therapy for arthritis. We have well realized that this disease has no specific causative agent, and there can be no single cure. From observations in a large number of cases, and from recent published reports, as well as from private communications, we have concluded that vitamin D in massive doses is a most valuable adjunct to the present armamentarium in the treatment of arthritis. The following case reports illustrate our procedure of treatment. It will be apparent from the reports of these cases that to reestabish the physiologic equilibrium we resorted to other measures in addition to vitamin D.

Case 1. L. S. Atrophic arthritis. White, male, aged 49, clothing cutter, was first seen Jan. 5, 1934, complaining of pain and swelling of wrists knees, ankles, feet and shoulders for one year. He was in good health until November 1932, when he suddenly developed numbness in the fingers of the right hand followed by pain and stiffness of the right wrist. Two weeks later his left wrist and shoulders became involved. He was free of swelling for over a year. In January, 1933, he noticed pain, swelling and stiffness in both knees that gradually became worse until he became completely disabled and could not extend his legs. He was treated with streptococcus vaccine, hot baths, salicylates and high colonic flushings with no results.

On examination the patient did not appear acutely ill. On attempting to walk he assumed a position of marked flexion of the hips, limited extension of legs and on walking his feet scraped along the floor. There was swelling, stiffness and tenderness of the wrists, shoulders, elbows, knees, ankles and feet.

Throat culture revealed no hemolytic streptococci. Urine was not abnormal. Hemoglobin 11 gms., erythrocytes 4,540,000, leukocytes 6,500, gastric analysis showed free acid 14 total acid 46, stools negative for blood. Gastrointestinal x-ray examination revealed left side stasis. X-ray examination January 26, 1934; hand revealed narrowing of joint spaces in phalanges. Early development of punched out areas on second phalanges. Diffused bone atrophy, especially metacarpal and phalangeal. Same finding in knees. Foci of infection were not found.

While in the hospital this patient received daily 200,000 I. U. vitamin D beginning Jan. 19, 1934; on Feb. 5 this dose was increased to 450,000 I. U. This

patient stayed in the hospital from Jan. 5, 1934, to Feb. 22, 1934, during which time his condition became very much improved, so much so that he was able to walk without much difficulty. He could bend his knees without much effort and had almost complete extension of knees and complete motion of hands, wrists, elbows and shoulders with no muscle spasm. He also gained weight and felt much stronger when he was discharged on March 12, 1934.

Since then he has continued 180,000 I. U. vitamin D with periods of therapeutic vacation of two weeks to two months. In June, 1934, he resumed work part time. He increased working time gradually and now works full time. At first he became worse when not taking the vitamin D and recovered promptly upon resuming it. Recently he found that when he abstained for three months he had a recurrence of pain in the fingers of both hands. This was accompanied by swelling. Since that time he has resumed the medication of 180,000 I. U. vitamin D and has been entirely free of pain and sensitivity to changes of weather. He has no limitation of motion of hands, wrists, knees, ankles and feet; is able to walk long distances after work without any discomfort.

Sept. 1, 1936, x-ray check-up: Recalcification of distal epiphyses of radius, ulna and carpals of both hands, metacarpals show sharper outline of cortical margins and marked homogeneity of cancellous portion. A similar picture is found in both knees.

Case 2. H. S. Atrophic arthritis, male, white, aged 43, street car conductor, was first seen on March 22, 1934, complaining of pain and stiffness of joints especially knees, of 2½ years duration. Onset gradual in ball of right foot with pain on standing. This pain was relieved by diathermy after 3 weeks of treatment. He was well for 6 months when both knees became painful, swollen and progressively stiff. Soon after the left ankle became involved followed shortly by the left shoulder and elbow. Lumbosacral region of back and neck became stiff. Aspirin and salicylates offered temporary relief, vaccine no relief (4 doses), heat and massage some relief, and blanket sweats aggravated the condition. He was constipated and had lost considerable weight.

He had frequent sore throats, upper respiratory infections, and in 1919 had had influenza.

Examination revealed fusiform swelling of left fourth finger with bilateral muscular weakness. Both knees showed marked swelling and local heat with superficial venous dilatation, marked coarse crepitus and limitation of extension. Patient walked with two canes, dragged feet along floor in shuffling steps and required assistance to get in and out of bed. No foci of infection were found in teeth, nose, or throat.

X-ray: examination of hips on April 24, 1934, revealed narrowing of joint, especially on the right, diffused atrophy of hands and wrists; narrowing of joint spaces, thickening of cortex, especially on the right, lateral displacement of wrist joint, punched out area on lateral border of right radius, blurring of small bones, especially the semilunar, marked atrophy of tibia, less atrophy of calcanous, marked narrowing of articular surfaces of the knees, patella appeared fixed and anterior surfaces roughened, right tibia revealed a punched out area on the posterior aspect, marked diffused spotty atrophy of bones.

Laboratory: Urine was negative. Hemoglobin 12½ gms. R. B. C. 4,130,000. W. B. C. 8,600. Blood chemistry: Glucose 81 mgm., N. P. N. 26 mgm., CO_2 combining power 46. Blood Kahn negative.

Hospital management: This patient received vitamin D starting with 200,000 I. U. daily; on April 9, 1934, gradually increasing to 250,000 I. U. The patient was partly ambulatory and performed exercises in bed. On May 2, 1934, he began graduated walking exercises. He left the hospital on May 23, 1934, walking without support and improved subjectively and objectively.

Follow-up: He has been observed for two years after discharge from the hospital, and has been seen at intervals of 3 weeks. In this period he has continued to improve in weight and strength. He has less stiffness in his knees and hands. Seventeen months after discharge he was well enough to work as a street car conductor, and resumed his employment. Since leaving the hospital he has continued the viosterol in decreasing doses for periods of 2 weeks followed by 1 week therapeutic vacation. He has maintained the diminished sensitivity to weather changes, an improvement which first appeared while undergoing hospital treatment.

Aug. 8, 1936. X-ray examination of pelvis and both hips showed general recalcification and reestablishment of trabeculation and thickening of cortex throughout involved areas.

Just what physiologic influence vitamin D has on individuals who show arthritic manifestations we are as yet not ready to say. Whether patients who are benefited by vitamin D therapy suffer from a vitamin deficiency, as has been suggested by Livingston[1], is rather questionable. Extensive long time study on mineral metabolism[2] of arthritic patients under controlled conditions during hospitalization has given some information about the mechanism of action of vitamin D. During preliminary control periods most arthritis patients show a condition of imbalance in calcium metabolism which is not reflected in alterations in concentration in the blood stream, but is manifested by disturbed balance between the amount ingested and that excreted. Sometimes there was pronounced positive balance which means that for considerable periods the subject had not been eliminating calcium in proportion to the intake. This was commonly, although not constantly, seen in those cases in which extensive ankylosis and flexion deformities were seen.

In other cases there was an irregular negative balance alternating with an approximately even

balance. For periods of several days at a time there was a large increase in the fecal calcium output with practically a constant level of excretion in the urine. This means that either the ingested calcium is not absorbed and accumulates in the atonic gut and is then eliminated whenever motor activity in the gut is augmented or else there is extraordinarily rapid excretion through the intestinal mucosa. At present there is no direct evidence that would enable one to decide which of these processes predominates but it seems more probable that the first is the true explanation.

At any rate, when vitamin D therapy is instituted the blood calcium level is likely to be somewhat increased for a few days. Following this there is usually a progressive increase in the urinary calcium on a shift from feces to urine. With this the blood calcium returns to the normal level. Clinical improvement becomes apparent with the increased calcium output in the urine. If the observation is continued long enough there is a tendency to establish an approximately even balance between intake and excretion regardless of the direction of imbalance originally present.

Finally, the urinary calcium output gradually falls off progressively and a slight but fairly constant positive balance is established. X-ray examination now shows recalcification of bones and restoration of trabecular patterns. So long as this process continues there is progressive clinical improvement. It is tentatively suggested that the limit of improvement under vitamin D therapy coincides with the limit of tolerance to recalcification without overcalcification. Further clinical improvement must, therefore, be accomplished by other forms of therapy. The absorption of exostoses is apparently accomplished during the perod of high elimination of calcium in the urine.

Contrary to a recent report by Wyatt[3] and his coworkers that patients with gastrointestinal disturbances do not tolerate vitamin D in massive doses, we have not found this to be true in our experience. The only contraindications for vitamin D that we have found are cardiovascular and renal disease. Neither have we had in our experience the high percentage of intolerance to vitamin D in massive doses as reported by Wyatt —nor are we certain that all manifestations of nausea were due to the vitamin D therapy. Most arthritis patients suffer from gastrointestinal disorders and just how much nausea that is reported is due to the gastrointestinal disturbance per se and how much is due to the therapy is questionable. However, caution should be exercised and the medication discontinued when the patient complains of nausea which is the most common early symptom of intolerance. The next most common symptom of toxicity is frequency of urination without necessarily a polyuria. Other manifestations of early symptoms are lassitude, anorexia, polydipsia. Still more severe signs of toxicity are vomiting, colicky gastrointestinal pain and diarrhea. A word of caution should be mentioned here: while the toxicity of vitamin D in the treatment of arthritis is no more hazardous than other drugs used for any ailment in medicine, it, like any other drug, must be administered with care and like any other drug may not be tolerated by certain patients. The initial doses should therefore be small and if symptoms of intolerance are manifested by the patient it should be immediately discontinued. The patient should be instructed to be on guard for symptoms of nausea and increased urination—the early symptoms of intolerance. If the medication is discontinued when early signs of toxicity are manifested the patient suffers no ill effects, and the treatment is resumed within ten days to two weeks, starting again with a minimal dose. Another precaution we have found it necessary to take to combat toxicity is the simultaneous administration of 6 grams of brewer's yeast daily.

In the Clinic at the Research Hospital, we start with the initial dose of 150,000 units daily, increasing the dose by 30,000 units daily every two weeks, till 300,000 units are given. The maintenance of this dose depends on the clinical progress of the patient. Some cases show improvement in two weeks, while others may not show any favorable results for six months. Results are evaluated in three ways:

1. Clinical.
2. X-ray.
3. Laboratory.

The patients who reacted favorably manifested the following clinical improvement: decreased pain, decreased swelling, decreased vasomotor instability; increased appetite, increased mobility of affected joints, increase in weight. Most of the patients reported lessened fatigue, lessened sensitivity to weather changes and increased muscular tone. In nearly all cases the cold

clammy sweating of the hands was markedly diminshed, and gastrointestinal disturbances were less noticeable. In patients who manifest clinical improvement the dose is gradually reduced after six months and they are kept on a maintenance dose of 180,000 units with periods of two weeks therapeutic rest every four months.

X-ray findings show recalcification of the bones.

Laboratory findings show decreased sedimentation rates; increased R.B.C.

Earlier in the paper I stated that our attitude concerning vitamin D is such that we consider it an important adjunct in the present treatment of arthritis, and that physiologic equilibrium cannot be obtained through the medication of vitamin D alone. The next factor in our constitutional therapy is *Rest.*

Every new patient is considered as an acute case and as such he is confined to bed as much as possible and the degree of activity is instituted according to his state of health. With the instituting of rest we attempt to correct the nervous, vascular and gastrointestinal imbalance. By being confined to bed the patient is relieved of the strain of the sympathetic nervous system[4], the capillary circulation again becomes stabilized, the low grade edema so commonly observed in arthritics is diminished. The rest, however, should not be of such nature as to allow ankylosis. Exercises should be allowed within the painless arc of motion. The saying that, "one movement a day keeps adhesions away" is most applicable in the atrophic cases. Many of the arthritic patients are maladjusted to their environment and tend to become neurotics. Adjustment to their environments will usually be followed by reestablished equilibrium of bodily functions.

Diet. Nearly every conceivable diet has been tried in arthritis. There was a time when the disease was associated with accumulation of uric acid in the body, and red meats and acid fruits were therefore forbidden. Today we realize that uric acid plays only a minor part in arthritis, if it is to be considered at all, and this concept of diet has been discarded. There are those who still adhere conscientiously to the low carbohydrate and high protein diet. Our plan has been to place the patient on a balanced diet most suited for the particular individual. If the patient is underweight and anemic, he is placed on a high caloric diet with no limitation of the concentrated carbohydrate foods, vitamins, green vegetables and fruits. Obese patients are placed on a diet including low amounts of starch and fat foods. The diet is regulated according to the needs of the patient. Food allergies are ruled out whenever possible. Generally speaking, once the patient begins to gain weight he should not be allowed to become overweight. On the average one should allow from 25 to 30 calories per kilo body weight; protein, 1 gram per kilo body weight and a reduced quantity of concentrated carbohydrate foods. The sole benefit derived from reduced carbohydrate foodstuff is probably that it allows the patient ample appetite for vitamin and mineral foods.

Bowel Habits. There still is considerable controversy as to the role played by the bowel as a factor in arthritis. There are those who advocate intestinal antiseptics and colonic irrigations. We have never followed any such procedures. In patients who suffer from gastrointestinal disturbance, we endeavor to correct the condition. We do not use oil to promote intestinal elimination because there is a possibility that oil interferes with the absorption of vitamin D. Mild cathartics are, therefore, advised.

Foci of Infection. We do not disregard the matter of foci of infection. If the patient presents a history of arthritis of several years standing, we do not look for foci of infection. It is claimed by many observers (Holbrook, Crowe) that removal of foci in arthritis of long duration is rarely beneficial. If, however, the disease is of short duration, we attempt to remove all possible sources of infection.

Medicinal. We do not resort regularly to drugs for the alleviation of pain; it is only occasionally that we prescribe acetyl salicylic acid in 5 grain doses. We have used elixir glycocoll in private patients who complain of fatigue. To patients who show symptoms of neuritis, we give vitamin B.

Vaccine was used only in those cases that failed to respond favorably to vitamin D after a six month trial. To date, only one out of six cases of this series has been improved by vaccine therapy.

Local Measures. Passive exercise is prescribed to patients at rest to avoid muscular atrophy and the formation of new adhesions. This exercise without weight bearing is gradually increased in duration, but always within the painless range.

Heat in any form, particularly hot packs of saturated magnesium sulphate, increases peripheral circulation and decreases pain. *Massage*, gently stroking the involved joint, is also found to be greatly beneficial.

Prevention of Deformity. While there is no difference in the general treatment of hypertrophic and atrophic arthritis, it is very important to prevent deformities which are very common in the atrophic type. These deformities are usually flexion of the knees, elbows, wrists, fingers and hips. The joints should be kept in extension by splints, casts, or other similar devices. It is important that should the joint become ankylosed, the fixation should be in the optimal position for use.

In our experience, exacerbations do occur, but not definitely related to the interval of rest from therapy, or the permanent discontinuance of vitamin D. The time element should be emphasized strongly to the patient if adequate treatment and relief is expected. It has been suggested[5] that the time required to arrest the progress of an arthritic condition is analogous to the time required for the arrest of pulmonary tuberculosis. A patient with active tuberculosis seeking relief expects to be under active treatment by the physician not for weeks, but for months, or years. A patient seeking relief from arthritis should be made to understand that the treatment of arthritis can be compared with that of tuberculosis and in arthritis as in tuberculosis he may expect the abeyance of the active process only as long as he follows the fundamental principles of the treatment; that exacerbations of the condition may follow, as in tuberculosis, by violation of these principles.

Conclusion. In closing, it may be said that while there is no specific treatment for arthritis, yet with the present form of therapy 75 to 80% of the cases can be benefited to an appreciable extent and the progress of the disease arrested. Again we repeat that we have found vitamin D in massive doses to be an important adjunct in the treatment of arthritis. Investigations are being carried on at present to determine in which group of cases vitamin D will be most beneficial. If this paper has done nothing more than to arouse further interest in intelligent treatment of this widespread and stubborn disease, it will have served its purpose.

REFERENCES

1. Livingston, S. K.: Vitamin D and fever therapy in chronic arthritis. Arch. Phys. Therap. X-ray, Rad., 27: 704, 1936.

2. Dreyer, I., Steck, I. E., Hathaway, M. L., Reed, C. I., and Struck, H. C.: Observations on mineral metabolism in arthritis patients under treatment with vitamin D. (unpublished.)

3. Wyatt, B. L., Hicks, R. A., and Thompson, H. E.: Massive doses of vitamin D in the treatment of proliferative arthritis. Annals Int. Med., 10: 534, 1936.

4. Pemberton, Ralph: A few simple recommendations to the general practitioner in his care of arthritics. Ill. M. J., 70: 479, 1936.

5. American Committee for Control of Rheumatism: Primer on Rheumatism and Chronic Arthritis; 1934.

PROSTATITIS AND VESICULITIS:
Treatment with Local Heat

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The physiological basis for the use of heat as a therapeutic agent was not unknown to the ancients, and among the Romans heat was commonly applied in the form of radiant heat and hot baths. In the modern literature on the subject (which includes among others the excellent writings of H. C. Bazett, Ralph Pemberton, George Gellhorn, E. P. Cumberbatch, and H. E. Stewart) it is pointed out repeatedly that restoration, like all other progressive activities of the living organism, is brought about by active hyperemia—and that the best means of producing such hyperemia artificially is by use of heat.

Careful clinical work and experimentation has shown that heat places the tissues in a condition to respond better, in that they are softened and the dilated lymphatics and blood channels are probably able to remove more quickly than otherwise the fluids and metabolic detritus displaced by massage or other activation. Further clinical studies show that any change in temperature has a profound effect on the metabolic changes of any tissue.

The impressive amount and quality of recent work in the field of heat therapy prompted the writer early in 1935 to undertake clinical study of its possibilities in the treatment of simple prostatitis and cases of prostatitis combined with vesiculitis on a venereal basis.

In order to eliminate possibility of confusing factors, the study was at the outset confined to a single method of application of local heat. Thus, this paper makes no attempt to outline

or to discuss the relative merits of the various forms of heat therapy. Consideration has been given only to a method by which local heat is introduced directly into the prostatic area by means of a rectal applicator supplying constant heat. And the term "method" as here used embraces not only the specific heat appliance used, but also the manner in which treatment was regularized, i. e., office treatments at fixed intervals and carefully supervised treatments by the patient himself in his home, on a fixed schedule.

The series of individual cases here presented, and the tabulation of treatment results obtained, are therefore offered for whatever they may contribute to solution of the general practitioner's problem: *"What principle and what method appears to offer the most efficient treatment for simple prostatitis?"*

The study was begun in February, 1935, and extends through April, 1936. Initial work was confined to selection of a constant heat rectal applicator capable of demonstrating a measurable degree of heat penetration into the urethra. It was recognized that there are a number of simple prostatic heat applicators on the market; many of them extremely simple of operation, comparatively inexpensive, and quite safe for use by the patient under a physician's direction. Also, the necessity for obtaining a number of such appliances (duplicates in electrical dependability, heat production, etc.) was recognized.

An applicator of acceptable design and rating was selected (see descriptive data, Table 1) and a special "heat penetration" test was made. Six subjects were selected for this test, the method and results of which are shown in Table 2. Proof of heat penetration through a demonstrable section of tissue was deemed highly satisfactory for my purpose, and specially adapted prostate case record forms were immediately devised (see Tables 3 and 4). The study proper was opened on March 25, 1935, with form entry of the first case in the series.

Forty cases in all were recorded, with division of this number into two groups of twenty patients each. Group I was examined and given one office treatment with the applicator weekly, and each patient in this group was furnished with a duplicate appliance for an instructed daily application by the patient in his home.

Group 2 was used as a control group, and each patient in this group received an office treatment daily, with office examination weekly.

The period over which treatments extended for each of the forty cases averaged approximately three months. The duration of each daily treatment (whether given in the office or taken under instruction by the patient himself) ranged from forty minutes to one hour, with an average of about fifty minutes. In each case the degree of heat used was determined by personal tolerance of the patient, with adjustment just below maximum tolerance.[1]

Urethral smears and microscopical examination preceded institution of treatment in each case, with subsequent smears at regular intervals of one week until case was discharged. The cases showing infection at the outset required on the average approximately five weeks to obtain a negative smear.

The progress of improvement in the two groups advanced with little if any variation in rate. Assuming that each patient followed the simple routine outlined for his home applications, there is no reason to believe that there should be a variation. The composite tables (shown in Tables 5 and 6) record the results obtained in Groups 1 and 2 respectively.

The writer believes the picture disclosed by this study to be significant. Reference to tables shown in Tables 5 and 6 will show the following results for the forty cases studied:

15 cases show excellent results.
6 cases show no marked change.
15 cases show good results.
4 cases show fair results.

In other words, only six cases (or 15%) of the total failed to obtain outstanding benefit. Thirty cases (75%) were discharged as cured. Four cases (10%) showed fair improvement.

It would appear that the possibilities made apparent by this large positive figure might justify extended research. Elaboration of method, together with expansion of the patient list would probably do much to complete the picture here indicated.

1. An explanation of the device for regulation of heat production is given in the note accompanying Table 1.

TABLE 1. DESCRIPTION OF HEAT APPLICATOR

Mechanical details (as furnished by the manufacturer):

Applicator: Polished hard-rubber surface barrel, with 4½-inch length over all (dull tapered tip on introductory end). Greatest diameter of barrel (at swells) 11/16 inch. Heating element consists of 18 inches of .008 nichrome wire, of 10.2 to 10.5 Ohms resistance per foot.

Connections: Ten feet of cord, with female connector on applicator end and "series current" tap (for electric lamp in series) at wall plug end. Cord is equipped with regular "feed-through" switch, spaced 18 inches from applicator end.

Electrical Rating:

*Size of Lamp	Input Voltage	Ampere Consumpton Per Hour	Applicator Unit Total Resistance
40 Watt	5 Volts	.3333	15 Ohms
50 Watt	7 Volts	.4066	15 Ohms
60 Watt	8 Volts	.5333	15 Ohms

*Standard electric lamps of 40, 50, and 60 Watt capacities (each lamp furnishing a fixed resistance in the complete circuit) are used to furnish variable resistance, and thus variable heat intensity, in the applicator itself. Insertion of a lamp in the "series current" tap completes the circuit. Thus, the 40 watt lamp gives *lowest* applicator heat production—the 60 watt lamp gives *highest* applicator heat production. The table shown immediately above illustrates this temperature regulation factor in terms of absolute voltage input and resultant ampere consumption.

TABLE 2. HEAT PENETRATION TEST ON RECTAL APPLICATOR

(By thermometric measurement through urethra)

Case Number	Temperatures at time current was turned on, applicator inserted, and test begun: Room	Mouth	Urethra	Application in minutes	Temperatures at time current was turned off: Room	Mouth	Urethra	Increase in temperature urethral
4037	76°	98.4°	99°	30	75°	98.4°	100 °	1.0°
4050	76	98.6	99	30	74	98.6	100.5	1.5
4057	76	98.4	99	30	74	98.4	100.5	1.5
4019	76	98.4	99	60	75	98.4	101	2.0
4028	74	98.2	99	60	76	98.2	101	2.0
4034	74	98.6	99	60	76	98.6	101.5	2.5

The following instruments were used in perorming the above tests:

1. Conventional intra-rectal heat applicator (described in Figure 1).
2. Fahrenheit thermometer, special type (German manufacture) adapted for recording tissue temperature in diathermy work.
3. B&D clinical thermometer, Certified, as manufactured by Becton, Dickinson & Co.
*4. Wall thermometer, special type used by Swift & Co., Chicago, in meat refrigeration plants.
5. Hamilton watch, 17 jewel, No. 983132, Hamilton Watch Co., Lancaster, Pa.
6. Mazda 60 watt, 120 volt lamp.

*Room temperature controlled by Minneapolis-Honeywell system—building heated by oil.

NOTE: The series of tests tabulated above were made during the first three weeks of February, 1935, on my own list of patients, and in my offices at 716 Wellington, Avenue, Chicago, Illinois.

TABLE 3

GROUP 1

Name—R. K. Address—.....

Case Number—5010. Age—44. Occupation—Electrician.

Complaint—Pains in rectum, always tired, general ill health; piles.

Diagnosis—Prostatitis, chronic—on old venereal basis; vesiculitis on right side.

TREATMENTS

1935 Date	Length of Time	Type of Instrument Used	Patient's Own Report	Laboratory Findings	Remarks
		Intra-rectal heat applicator		Gram positive diplo. intracellular and extra-cellular	Prostate much enlarged and boggy, with tenderness
4/ 5	1 hour	Do	No improvement		
4/12	1 hour	Do	No improvement		Slightly improved
4/19	1 hour	Do	No improvement		Slightly improved
4/26	1 hour	Do	Slight improvement		Slightly improved
5/ 3	1 hour	Do	Slight improvement		Slightly improved
5/10	1 hour	Do	Slight improvement	No bacteria found	Slightly improved
5/17	1 hour	Do	Much improved	Negative	Slightly improved
5/24	1 hour	Do	Much improved	Negative	Tenderness gone
5/31	1 hour	Do	No complaints	Negative	Swelling reduced, marked
6/ 7	1 hour	Do	No complaints	Negative	Prostate normal
6/14	1 hour	Do	No complaints	Negative	Prostate normal
6/21	1 hour	Do	No complaints	Negative	Prostate normal
6/28	1 hour	Do	No complaints	Negative	Prostate normal

Patient was discharged on July 1, 1935. Patient stated all symptoms had disappeared. Final examination revealed complete recovery.

TABLE 4

GROUP 2

Name—L. W. G. (Married.)
Case Number 7980. Age—45.
Address—.....
Occupation—Laborer.
Complaint—Pains in back and rectum; impotence; failing healt h; pains and distress worse while on feet.
Diagnosis—Hypertrophy of prostate—cause undetermined.

TREATMENTS

1936 Date	Length of Time	Type of Instrument used	Patents Own Report	Laborator Findings	Remarks
		Intra-rectral heat applicator		Negative	Prostate hardened and slightly enlarged
2/1-7	40 min.	Do	No change	Negative	No change
2/8-16	40 min.	Do	No change	Negative	No change
2/17-27	40 min.	Do	Feels much better	Negative	Prostate somewhat better
2/28-3/5	40 min.	Do	Marked improvement	Negative	Prostate normal in size
3/6-14	40 min.	Do	Pains disappeared	Negative	Prostate normal
3/15-24	40 min.	Do	No complaints	Negative	Prostate normal
3/25-4/2	40 min.	Do	No complaints	Negative	Prostate normal
4/3-10	40 min.	Do	No complaints	Negative	Prostate normal
4/11-14	40 min.	Do	No complaints	Negative	Prostate normal

Patient dismissed on April 15, 1936. Patient stated pains in back and rectum had completely disappeared and that his health was much improved—impotence still present. Final examination of this patient by Dr. Pfannebecker and myself revealed prostate normal in size and condition.

ILLUSTRATIVE CHART OF BACTERIOLOGICAL STUDY OF FOCI

TWENTY PATIENTS

NUMBER OF ORGANISMS FOUND IN THE ORIGINAL BROTH CULTURE

Patient	Nose	Throat	Feces	Urine
C. A.	3	3	Many	0
P. A.	3	2	Many	2
G. B.	2	3	Many	2
H. B.	3	2	Many	1
E. C.	3	2	Many	1
S. C.	3	2	Many	1
J. E.	2	3	Many	1
L. F.	3	2	Many	1
L. F.	2	3	Many	0
E. G.	3	2	Many	3
P. H.	2	3	Many	1
R. H.	3	2	Many	2
G. H.	3	2	Many	0
O. I.	3	2	Many	2
H. M.	3	2	Many	1
I. R.	2	3	Many	2
M. R.	2	3	Many	1
M.	2	2	Many	0
S. G.	3	3	Many	1
D. K.	2	3	Many	0

NUMBER AND KIND OF ORGANISM FOUND BY THE PATHOGEN-SELECTIVE METHOD

Nose	Throat	Feces	Urine
1-Staph	1-Strep	0	0
1-Staph	1-Strep	0	1-Strep
0	0	1-Strep	0
1-Staph	0	0	0
1-Staph	1-Strep	1-Strep	1-Strep
0	0	1-Strep	0
0	1-Staph	0	0
1-Staph	0	0	0
0	1-Strep	0	0
1-Staph	0	0	1-Staph
0	0	0	0
0	0	0	1-Staph
0	1-Strep	0	0
1-Staph	1-Strep	1-Staph	1-B. Coli
0	1-Strep	0	0
1-Staph	1-Strep	0	1-Strep
0	1-Strep	1-Strep	0
1-Staph	0	0	0
1-Strep			
0	0	0	0
0	1-Strep	1-B. Coli	0

Specific Vaccines. Specific vaccines for these patients were prepared from the organisms obtained by this method. Eighty-one of these vaccines were standardized to the individuals in our laboratories and the patients were then returned to the physician for treatment.

Twenty-three vaccines with specified dilutions were sent to the physician without being standardized to the patients by us.

Four patients were turned over to us by their physicians *carte blanche*, and we were asked to give our vaccine as we deemed fit, and report results. Data concerning the other patients for whom we made the specific vaccines are now being collected from the referring physicians.

The charts of the four patients are presented below:

Miss E. L., nurse, aged 25 years. Referred to us February 20, 1934, with the following story: Right peritonsillar abscess six years ago. One year later pain developed in right wrist. This pain was periodic until three years ago, when pain developed in both wrists and has been constant ever since. No other joints were involved. At that time both wrists were markedly swollen and deformed, and very painful. She was unable to hold a thermometer or to wring dressings from hot solutions.

TABLE 5. COMPOSITE TABLE FOR CASES IN GROUP I

Case No.	Symptoms and Findings	Microscopic	Diagnosis	Number of Treatments	Results	Remarks
5002	Impotence and mental depression; small, fibrous prostate—with tenderness	Negative	Prostatitis, chronic, with fibrosis	77	Fair	Symptoms much relieved; prostate unchanged
5010	Pains in rectal area, tired feeling; piles; prostate enlarged and boggy	Gram positive diplo.	Prostatitis and vesiculitis—on an old venereal basis	84	Excellent	All symptoms gone; prostate normal, smear negative
5041	Pains in rectum, impotence; prostate soft, enlarged and very tender	Negative	Prostatitis, low grade, with vesiculitis	84	No marked change	Symptoms only partially reduced, no marked change in condition of prostate
5076	Pains in back, dripping of urine, constipation, impotence; prostate enlarged, very soft; vesicles tortuous	Negative	Prostatitis and vesiculitis, chronic—origin undetermined	49	Fair	Patient dropped treatment. Symptoms greatly relieved, and prostate improved moderately
5094	Back and leg pains, pain in rectum, impotence; prostate enlarged, boggy	Negative	Prostatitis and vesiculitis, chronic, on old venereal basis	84	Excellent	All symptoms except impotence gone; prostate showed marked improvement, swelling markedly reduced
5109	Nocturia, pains in rectum, bleeding piles, impotence; prostate enlarged, very soft with extreme tenderness	Negative	Hypertrophy of prostate; hemorrhoids	84	No marked change	Patient dropped treatment. No appreciable relief of symptoms. No change in prostate.
5203	Pains in rectum, run-down feeling; prostate enlarged and boggy	Negative	Prostatitis, chronic	84	No marked change	Some symptoms still present; no marked change in condition of the prostate
5217	Pains in back, heavy feeling in rectum; prostate enlarged and spongy	Mixed infection	Prostatitis and vesiculitis, chronic	84	Good	Symptoms gone; prostate normal; smear negative
5405	Dribbling of urine, weak erection, premature discharge; prostate enlarged and soft with great tenderness	Negative	Prostatitis and vesiculitis, chronic—on an old venereal basis	84	Good	Symptoms gone; prostate normal; smear negative
5498	Pain in rectum, morning drop, tires easily; prostate greatly enlarged and boggy—with tenderness	Gram positive diplococci	Prostatitis and vesiculitis, on an old venereal basis	118	Excellent	All symptoms gone; prostate back to normal size size and condition; vesicles normal

5653	Difficulty in passing urine, morning drop, pain in rectum; prostate enlarged and vesicles tortuous	Negative	Prostatitis and vesiculitis, chronic, on an old venereal basis	91	Good	All symptoms gone; prostate markedly improved; vesicles normal.
5702	Pains in rectum, partial impotence; prostate enlarged, soft, tender	Negative	Prostatitis and vesiculitis, chronic—old venereal	118	Excellent	All symptoms gone. Prostate normal.
5914	Pains and full feeling in rectum, partial impotence; prostate greatly swollen	Negative	Prostatitis, chronic	118	Excellent	All symptoms gone. Prostate normal.
6060	Pain in rectum, debility; prostate spongy and enlarged—infection denied	Negative	Prostatitis and vesiculitis, chronic	70	Good	All symptoms gone. Prostate markedly improved
6407	Pain in rectum, morning drop; prostate very boggy and much enlarged	Gram positive diplococci	Prostatitis and vesiculitis, chronic, venereal origin	77	Good	All symptoms gone. Prostate improved. Smear negative.
6814	Pains in rectum, loss of appetite; prostate enlarged and spongy	Gram positive diplococci	Prostatitis, acute—of an undetermined origin	84	Excellent	All symptoms gone. Prostate normal. Smear negative.
7160	Pains in rectum, morning drop, partial impotence; prostate soft and enlarged	Gram positive diplococci	Prostatitis and vesiculitis, acute—on an old venereal basis	84	Excellent	All symptoms gone. Prostate and vesicles normal. Smear negative.
7203	Painful urination, steady fullness in rectum; prostate enlarged and very tender	Mixed infection	Prostatitis, sub-acute—on an old venereal basis	118	Excellent	All symptoms gone. Prostate normal, tenderness gone. Smear negative.
7335	Dragging down pains in thighs, morning drop, prostate very boggy and much enlarged	Gram positive diplococci	Prostatitis, acute—origin undetermined	84	Excellent	All symptoms gone. Prostate normal. Smear negative.
7400	Difficulty in passing urine, pains in rectum, tired out feeling; prostate enlarged and softened	Negative	Hypertrophy of prostate, origin undetermined	77	No marked change	Symptoms somewhat relieved. Prostated unchanged.

TABLE 6. COMPOSITE TABLE FOR CASES IN GROUP 2

Case No.	Symptoms and Findings	Microscopic	Diagnosis	Number of Treatments	Results	Remarks
5057	Pain and itching in rectum, drawing down pains in groin, partial impotence; prostate enlarged and spongy	Gram positive diplococci	Prostatitis and vesiculitis, chronic—on an old venereal basis	91	Good	All symptoms gone; smear negative; prostate markedly improved
5077	Pains in back and legs, dribbling of urine, fullness in rectum; prostate large, soft—extreme tenderness	Gram positive diplococci	Prostatitis and vesiculitis, chronic—on an old venereal basis	84	Good	Symptoms all gone; smear negative; prostate greatly improved
5078	Pain and fullness in rectum, debility, mental depression; prostate much enlarged and softened	Negative	Prostatitis and vesiculitis, chronic—origin undetermined	94	Good	All symptoms gone; prostate improved
5151	Pains in rectum, partial impotence, general ill health; prostate enlarged and soft with tenderness	Mixed infection	Prostatitis and vesiculitis, chronic—on an old venereal basis	100	Good	All symptoms gone; smear negative; prostate nearly normal in size
5308	Frequent urination, constipation, lack of pep; prostate swollen and softened	Gram positive diplococci	Prostatitis and vesiculitis, on an old venereal basis	70	Excellent	All symptoms gone; smear negative; prostate completely normal
5352	Pain in rectum and back, pus discharge and morning drop of 5-month duration; prostate enlarged and very spongy	Negative	Prostatitis and vesiculitis, chronic—on an old venereal basis	91	Good	Symptoms greatly relieved; prostate and vesicles normal
5445	Dragging down feeling and pains in groin, morning drop, pain and itching in rectum; prostate very large and softened	Negative	Prostatitis and vesiculitis, chronic—on an old venereal basis	105	Excellent	All symptoms gone; prostate normal
7980	Pains in back and rectum, impotence, pains worse while on feet; prostate hardened and slightly enlarged	Negative	Hypertrophy of prostate, cause undetermined	54	Excellent	All symptoms gone; prostate normal
8028	Fullness and pain in rectum with itching, debility; prostate soft and large	Pus cells few bacteria	Prostatitis, acute—on a venereal basis	54	Good	Symptoms markedly relieved; smear negative; prostate normal size

	ing, debility; prostate soft and large	Pus cells few bacteria	Prostatitis, acute—on a venereal basis	54	Good	Symptoms markedly relieved; smear negative; prostate normal size

8123	Pains in rectum, partial impotence; prostate enlarged and boggy	Negative	Prostatitis, chronic, with vesiculitis—old G.C. inf.	60	Good	Symptoms markedly relieved; prostate and vesicles markedly improved
8200	Pains in rectum and back, impotence; prostate enlarged and softened	Mixed infection	Prostatitis, chronic, on an old venereal basis	54	Good	Symptoms much relieved; smear negative; prostate greatly improved
8400	Pain and tenderness in rectum, whitish discharge; prostate enlarged	Negative	Prostatitis, acute—origin undetermined	60	Good	All symptoms gone; prostate improved
8459	Drawing down pain in groin, pains in rectum; prostate large and spongy	Mixed infection	Prostatitis and vesiculitis, Chronic—probable venereal	54	Fair	Symptoms much relieved; smear negative; prostate reduced but still tender
8521	Fullness and pain in rectum; prostate swollen, softened, extremely tender	Negative	Prostatitis, chronic, of undetermined origin	54	Good	Symptoms all gone; prostate improved
8709	Fullness and pain in rectur, pains in groin; prostate much enlarged, soft	Negative	Prostatitis, chronic, vesiculitis on left side	60	No marked change	Symptoms somewhat relieved; no marked change in condition of prostate
8923	Pains in rectum and groin, failing in health; prostate hard, slightly enlarged, very tender	Negative	Prostatitis, chronic, origin undetermined	60	No marked change	Symptoms somewhat relieved; tenderness and hardness of prostate improved
9000	Pains in rectum and back, whitish discharge; prostate swollen, soft	Gram positive diplococci	Prostatitis, acute—on a venereal basis	42	Excellent	All symptoms gone; smear negative; prostate normal in size
9204	Pain and itching in rectum, whitish discharge in morning; prostate very tender, much enlarged, boggy	Gram positive diplococci	Prostatitis, acute—on a venereal basis of several months' duration	54	Excellent	All symptoms gone; smear negative; prostate completely normal
9521	Pain and itching in rectum, partial impotence, failing health; prostate large and softened	Negative	Prostatitis, chronic—origin undetermined	60	Fair	Symptoms much relieved; tenderness in prostate gone, swelling reduced
9888	Fullness and pain in rectum, morning drop, difficulty in urination, prostate moderately enlarged, spongy	Negative	Prostatitis and vesiculitis, chronic—on an old venereal basis	84	Excellent	All symptoms gone; prostate back to normal size; tenderness all gone.

By the pathogen-selective method, a staphylococcus albus was recovered from the nose, and a streptococcus hemoliticus from the throat. Vaccines were prepared from each organism and were given alternately every 3-4 days until each was standardized to the patient. Then these were combined in the proper proportions and given once per week for one year. At the end of one year, most of the pain had disappeared, and hands and wrists were much stronger. The time interval was lengthened to two weeks, and treatment continued for six months. Then the time interval was changed to once per month. On November 17, 1935, she was dismissed. Her last visit was March 23, 1936. She has no pain, can use hands normally, and is doing all routine work required of nurses.

Mrs. H. E. H., housewife, aged 30 years, was referred to us August 22, 1933, with the story that at the age of eighteen she had fallen and injured her right hip. Five months later pain developed in the hip. At the age of nineteen she came to the United States. She married at the age of twenty-three. About this time pain developed in almost all of her joints. She attributed this pain to our damp climate. She became pregnant in 1928, and all arthritic symptoms disappeared. She was totally free of arthritic pains for eight months after delivery. By the ninth month postpartum, pain developed in the spine, and soon thereafter all joints became involved. She had to give up her household duties because of pain and weakness. At the first visit her feet were so swollen and painful that she had to wear old shoes with many slits throughout. Wrists, knees, and ankles were beginning to show deformities.

By the pathogen-selective method we isolated a streptococcus veridans from the throat. A vaccine was prepared, and she received injections twice per week for eight weeks. At the end of eight weeks the swelling had gone from the feet. All joints were more relaxed, and she had a greater range of motion. The time interval was increased to one week. She became pregnant in March, 1934, and was given an injection once per month until the end of the eighth month. She was delivered in November, 1934. She then returned to us for treatment, December 14, 1934. No symptoms were present, but she was advised to come every two weeks for winter and spring. On June 3, 1935, she was dismissed and instructed to return in the fall. She returned August 8, 1935, with some pain in one toe. She was given an injection every other week for four doses, and then dismissed with instructions to return if symptoms developed. She returned March 26, 1936, because of a little stiffness in shoulders on arising in the morning. She was given one injection.

The baby is now eighteen months old. There has been no return of true arthritic symptoms. She has cared for the baby alone, does all her household duties, and is living a typical normal life of the average housewife.

Mr. M. O., truck driver and buyer for meat packer, age 35 years. In and out of refrigerator many times per day. Referred to us May 31, 1934, complaining of pain, weakness and limitation of motion in left shoulder. This condition had been present for three years. He had had to lay off from work occasionally, and had been unable to dress himself.

By the pathogen-selective method, we isolated a staphylococcus albus from the posterior nares. A specific vaccine was prepared, and he was given an injection once per week for two months. The pain had now practically disappeared, and strength was returning to the muscles of the shoulder, hence on August 2, 1934, he was instructed to come every two weeks. On September 27, 1934, he went on a buying trip and returned to us November 11, 1934. His shoulder had given no trouble, but he had developed a slight pain in the left heel, during the past twenty-four hours. He was given an injection and instructed to return when and if symptoms returned. We saw him January 3, 1935, January 10, 1935, March 21, 1935, June 6, 1935, and February 4, 1936. His last visit was March 10, 1936. He is now working every day. Can dress himself and has normal use of his shoulder with only an occasional pain preceding a storm.

Mrs. J. P. V., housewife, aged 52 years, was referred to us November 8, 1934, complaining of pain in both knees, both ankles and the right foot. This pain began four years ago. Three years ago pain began in the left hip, and for the past two years, both hands and wrists had been painful and swollen. She had grown progressively worse, and was unable to do her own housework. Could scarcely get up and down stairs. Was awakened nightly with severe cramps in feet. The grip of the right hand was about 35% normal, and the left about 50% normal.

Staphylococcus albus was isolated from the nose by the pathogen-selective method. Standardization of the vaccine was begun November 19, 1934, and she was given two injections per week for six months. By this time her general condition was much improved and the interval between treatments was lengthened to one week. On July 19, 1935, she reported that she had walked around nine holes of golf. In October, 1935, she was instructed to come every two weeks, and in January, 1936, instructed to come once per month. Last visit, March 26, 1936. She now sleeps all night without cramps, and she negotiates three flights of stairs with ease. Goes on shopping tours for entire day. Is doing all her housework. She was dismissed with instructions to report once or twice per year.

Conclusions: 1. Original cultures may fail to isolate the specific germ in some patients with chronic arthritis, whereas by making use of the pathogen-selective method, the patient's whole fresh blood may inhibit the growth of non-pathogenic bacteria, thus allowing the etiological organism to grow out in pure culture.

2. If no organisms are isolated by the pathogen-selective method, it is probable that said focus is not giving rise to the joint symptoms.

3. Two of the patients whose charts are given (Mrs. J. P. V. and Mr. M. O.) were given vaccines made only from staphylococcus albus.

Both patients made satisfactory recovery. This fact would suggest that organisms other than streptococci may be responsible for some cases of chronic arthritis.

4. Conclusions relative to treatment cannot be drawn from a series of only four patients, but in view of the fact that all four showed a practical return to normal after years of progressing disabilities, we feel justified in recommending the method. Further, we feel justified in predicting that if such a study is made, and specific vaccine treatment started early, much crippling deformity may be prevented.

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REPERCUSSION THERAPY

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Since the beginning of x-ray research secondary radiation has presented a never-ending point of interest and a many-sided question for investigation. In radiography the problem has been in eliminating the effect of its soft radiation and in radiation therapy we have been interested in its utilization and in the consideration of its influence in the ultimate biological effect.

In the fields of physics and chemistry there have been recurrent if not actually unbroken studies of the physical-chemical and photochemical effect of x-ray bombardment of almost innumerable substances. In 1903 Kunz and Baskerville[1] published a study of fluorescence experiments on 13,000 minerals in the American Museum of Natural History. Even before this, incomplete or hypothetical reports had been made by Thomas Edison, J. J. Burbank, Arnold, Precht, Weidmann, and others.[2]

My first publication dealing with secondary radiation was in 1918.[3] At the time I did not know that certain head shadows I was describing were due to secondary radiation from a poorly designed plate holder. This was brought to my attention in a reply article by Dr. Sherwood Moore[4] who had had a similar experience. This somewhat embarrassing episode so impressed me with the possibilities of secondary radiation that it has been constantly in the foreground of study.

Read before the Section on Radiology of the Illinois State Medical Society, Springfield, May 20, 1936.

The development of the Bucky diaphragm and refinement of instruments and technique have about eliminated secondary radiation as a radiographic problem.

The study of depth dose, distribution of intensity, iso-dose curves, relation of wave length to biological effect and other phases of the therapy problem in relation to transmitted, absorbed and broken radiation have contributed greatly to our appreciation of secondary radiation questions. But even with all that has been done our conception of the possibilities in the utilization of secondary radiation is still slightly hazy and the work is incomplete.

The phase that carries the greatest challenge to research is in the study of increased secondary effect by injection of x-ray sensitive material into the bloodstream or the tumor mass. This form of possible secondary radiation I have called repercussion radiation to distinguish it definitely from the normal secondary produced in the body tissues when under x-ray influence.

That there is a considerable interest in this project is shown in the publications and in the unofficial reports of the studies of many investigators.

In London at the Cancer Hospital W. V. Mayneord[5] has investigated the idea from a physical-chemical viewpoint with these conclusions:

A. The particles of secondary radiator must be small to avoid internal absorption, i. e., in the particles themselves. Radius certainly $<10\mu$.

B. Only moderately heavy or very heavy metals seem likely to be useful as secondary radiators.

C. There is an optimum region of wavelength to be used if such a metal is employed.

D. Amounts of heavy metal of the order of 1 mg. per cubic centimeter of tissue are required to produce an appreciable effect.

E. The secondary β radiation which alone is effective owing to the small amounts of radiator possible, is almost completely absorbed by thickness of tissue of the order of 50μ, and it is therefore essential that the secondary radiators be brought into very intimate contact with the cells to be affected if any effective increased dose is to ensue.

At the University of Minnesota Stenstrom, Lohmann,[6] and Nurnbarger[7] have made ex-

haustive study of the photo-chemical changes in methylene blue under x-ray influence.

In the Smithsonian Institute Florence Myers located the wave length of ultra-violet most destructive to algae in the radiations most nearly approaching the x-ray band. At the University of Pennsylvania Drs. McDonald and Alexander have attempted to kill bacteria by the photochemical change of normally harmless compounds energized by x-ray.

University of California's Professor Lepeschkin killed yeast cells in a dark room by x-radiation. The cells gave off a demonstrable short wave fluorescence before dying.

These and other rumors and reports are mostly corollary to the question of repercussion radiation. Where definite work in this field is going on there seems to be an impenetrable wall of secrecy and the constant hope of finding a perfect repercussion or injection material.

This has generally been approached by injecting a solution which is supposed to have an affinity for cancer cells into the blood stream and then radiating the tumor mass. This has not been successful in any degree.

The injection of radium emanation and radioactive substances into the blood has been used with results ranging from nil to annihilation.

The injection of colloidal lead, gold and other heavy metals has proven useless.

Cancer cells are only modifications of normal tissue cells and it is rather improbable that they will take anything out of the blood stream in a sufficiently greater proportion than normal cells to prove effective in their destruction.

In Mayneord's trustworthy observation that this radiation will be absorbed in 50μ of tissue we find the basis for hypothecating an ideal repercussion.

To be effective for repercussion radiation the material which is to produce this radiation must surround and be in contact with the individual cancer cells. This can be accomplished only by introducing the material into the tumor mass directly.

First and foremost it must be a substance which upon exposure to x-ray will give off a radiation in the range of very long wave length x-ray. The nearer the wave length or quality approaches that of ultra-violet the better.

It must have a lowtoxicity when absorbed and carried into the general circulation as it may be necessary at times to use relatively large amounts.

It must be a true solution or a very dilute colloid suspension as repeated trials with the colloids of several heavy metals have shown that they do not infiltrate evenly and sufficiently among the individual cells and that they are mostly coagulated or precipitated by the body chlorides.

It must not be absorbed too rapidly as this will carry it away from the tumor mass before the radiation takes place.

It must not be extremely irritating if successful without general anesthesia.

To summarize these qualities the repercussin must be a non-irritating, non-toxic, true solution that is absorbed slowly and produces a large amount of secondary or repercussive radiation when exposed to x-ray.

H. S. Newcomer[8] of the Henry Phipps Institue of the University of Pennsylvania published in 1920 the report of his studies on x-ray fluorescence of certain organic compounds. His tables contain the radiation reactions of several hundred organic and inorganic compounds and are a valuable reference for anyone interested in secondary radiation. But most valuable were his conclusions. He found that most fluorescence was in the violet field extending into the blue and green and, therefore, useless for practical consideration in this field. Limited at that time by inadequate instruments he was unable to determine fluorescence below 2000 Å. The greatest fluorescence was found among inorganic compounds.

His most important finding was that the quality or amount of fluorescence could not be predicted with any relation to the combined qualities of the component elements and that no results could be classified on a basis of chemical structure. He reaffirmed the observation of Kunz and Baskerville that there is no rhythm or reason in behavior of various chemical combinations and that physical state also changes the quantity and quality of radiation as seen in the varying reactions of chemically identical minerals found in different physical states.

In view of these unchartable reactions and the unpredictable results of x-ray effect it is only natural that many physicists and chemists believe the clinical application of repercussion radiation an impossibility. Through the advice

and encouragement of Professor George L. Clark of the University of Illinois the laboratory and clinical investigations of many possible repercussive agents were carried on.

For the laboratory experiments a strain of healthy white rats was selected and all work has been done with this one strain in order to keep background conditions as nearly uniform as possible. Rats that had been implanted with the Flexner-Jobling rat carcinoma were obtained through the courtesy of Dr. Francis Carter Wood at the Columbia University, Institute of Cancer Research. The cancer tissue was removed from these rats, ground up and injected in the inguinal region of three ounce white rats. Usually from twenty to thirty were injected at one time. When the growth had reached about the size of a hazel nut the trials with the repercussive compounds were made. Before any of the compounds were injected into the tumor tissue, normal, healthy rats were injected with the repercussin in order to test the toxicity of the compounds. As the non-toxic compounds were selected the repercussin tests were made. Usually these were grouped in sets of three: Rats with tumors as nearly the same size as possible were selected; one would be injected with the repercussin but not radiated; the second would be injected and radiated with a fixed amount of x-ray and the third was radiated with the same amount of x-ray without injection. These rats were marked and kept in the same cage under identical conditions. Naturally many of the earlier tests showed but little difference in behavior of the two radiated rats; both would show the same amount of retardation of the growth, sometimes with a complete cure and at times one or the other might develop further growth and be granted euthanasia.

After eight months of trial, colloids and combinations of colloids of heavy metals were discarded. They are rapidly precipitated or coagulated in the body tissues and cannot be infiltrated among the cells. Colloids gave place to a series of benzine derivatives and these to a series of unrelated organic compounds. Early in 1934 attention was turned to salts of heavy metals. Of course there is no end of these and our only encouragement came from some of the simplest. Nearly all were absorbed too rapidly when used in aqueous solution and could not be retained long enough to permit sufficient radiation. Relative toxicity gave considerable trouble. Amounts sufficient for repercussion trials were injected into norma rats to test for toxicity and local irritation.

It must be noted that there is a vast difference in proportion of mass between a fifteen millimeter tumor and the body of a rat and the same size tumor and the body of a human subject. A dose that might be slightly toxic for a rat would be negligible when given to a human subject.

With the promise of usable results various solutions and amounts of sodium bromide were carried through several series of tumor rats. Sodium bromide has a fluorescing secondary with wave lengths between 5000 and 2400 Å with a band of diminishing intensity at 4000 Å. At 2400 Å it is well within the range of true ultraviolet and constitutes a destructive phase of radiation.

Concentrated solutions of sodium bromide are extremely irritating when injected and are absorbed rapidly. In making the animal experiments a local anesthetic of procaine and adrenalin was injected first and after five minutes for absorption to be complete the bromide injection was made with the animal in position at the x-ray tube and radiation was started immediately. In the later experiments we used solutions containing 0.6 grams sodium bromid per mil in a 3% acacia suspension. The acacia was added to retard absorption. The tissues being partially exanguinated by the adrenalin also added to the delay of absorption. For each calculated cubic centimer mass of tumor 0.1 mil of the solution was injected.

Tumors of the Flexner-Jobling type of rat carcinoma are not especially sensitive to x-rays and radium although one finds that a 2.0 cm. tumor will respond to about the same amount of radiation that would be required to destroy smaller growths. In using a repercussin in treatment one should be able to use less radiation than where no injection has been made. 2000r of unfiltered low voltage radiation will destroy most of the 1.5 to 2.0 cm. tumors. Therefore when the injection was used only 1500r of radiation was given and the question of the efficiency of the injected material was to be answered in the final result.

The tests were made on groups of from 12 to 20 rats with tumors of about the same size.

In each groups at least two would be injected without radiation. Three would receive 1500r without injection and those remaining of the group would receive the bromide injection and radiation. In no group was change seen in the tumor which could be definitely attributed to the injection only. These animals continued with the tumor growth until granted euthanasia. Of those receiving radiation and no injection the tumor would usually subside and then start growing and producing metastases. With those receiving the repercussion radiation we had about 40% apparent cures.

If more x-ray had been given these animals the percentage of cures would certainly have been made during the past two years. There given to the rats not injected an equally high percentage of cures would have resulted. The one point of value lies in the more rapid action with less x-ray when the repercussion method is used.

Clinical trials in carefully selected cases have been made during the past two years. There appears to be a more rapid reaction to the radiation with earlier slough when this method of reinforced radiation is used. The elapsed time is too short, the number of cases to small and judgment may be warped to easily by one's enthusiasm to justify conclusive statistication at this time.

The apparent result may be influenced by many factors which we at present do not understand and which will be clarified only by very extensive work. The supposed repercussive radiation may be a minor factor and the photochemical reaction between the injected material and the complicated protein molecules may answer the question. This is not presented as a finished work but to arouse interest in this important possibility in x-ray therapy. I sincerely hope that some research institution may carry on from here, check up my observations and complete the investigation in this very promising field.

BIBLIOGRAPHY

1. Kunz and Baskerville: Science, **18**: 769, 1903.
2. J. Amer. Chem. Soc., **42**: Part 2.
3. Williams, E. G. C, and Miller, A. M.: Annals of Surg., **68**: 521, 1918.
4. Moore, Sherwood: Annals of Surgery, **69**: 4, 1919.
5. Mayneord, W. V.: British J. of Radiology, New Series, **4**: 589-591, 1931.
6. Stenstrom, Wilhelm, and Lohmann, Anne: Radiology, **16**: 322, 1931. Radiology, **21**: 29, 1933. Radiology, **22**: 304, 1934.
7. Stenstrom, Wilhelm, and Nurnberg, Carl E.: Proc. of Society for Exp. Biol. and Med., **31**: 1073-1078, 1934.
8. Newcomer, H. S.: J. Amer. Chem. Soc., **42**: 1997, 1920.

DISCUSSION

Dr. Gianturco, Urbana: In connection with Dr. Williams' very interesting paper, I would like to mention a case that I have been following for two years. The patient, a 30 year old lady suffering from Hodgkin's disease, came to us with large mediastinal glands and enlarged liver and spleen. She was given a course of Roentgen therapy and at the end of a month the mediastinal glands had disappeared and the liver and spleen had returned to their normal size. Six months later she returned with large liver and spleen.

As the radioactivity of thorium dioxide was much publicized I thought that since this metal is deposited just in those tissues which are most affected by the Hodgkin's granuloma it might have a beneficial effect on the disease. The patient was given intravenously 50 cc of thorium dioxide sol. which at the end of three days distinctly visualized to the Roentgenogram the enlarged liver and spleen. A month was allowed to elapse but Roentgenograms of the abdomen taken at this time did not show any appreciable effect of the thorium rays upon the size of the enlarged organ.

At this point Roentgen ray therapy was resumed with the same factors used before and the decrease in the size of the liver and spleen was followed roentgenographically every ten days. The thorium imbedded in the liver and spleen must have acted as a perfectly distributed repercussor for the primary rays, but the decrease in the size of the organs occurred with no greater speed than when no thorium was present.

This case is interesting to me because, although it allows no definite conclusions, it seems to point out: (a) that the radioactivity of thorium must be quite small if it failed to affect as sensitive a gramuloma as Hodgkin's; (b) that the use of thorium as repercussor of the primary Roentgen rays does not seem to increase their biological action.

Dr. Harry Olin, Chicago: I do not know much about the repercussion theory only by experimentation I had in one case some years ago of amebic dysentery. It occurred to the clinician that if the colon were injected with a solution of eosin it might be helpful; that while the patient withheld that solution to give therapy to the colon, and that it would have some immediate benefit and value to the amebic dysentery. It was purely experimental on the basis that eosin would intensify the irradiation of the roentgen ray and, therefore, be of value to the patient. We tried out about three patients with amebic dysentery and in all gave four treatments to each case with no definite results clinically in improvement of the patient.

Dr. Hilt: I am not a physicist. I wish we had a physicist with us. I think a lot is proposed on the wrong theory of depth dosage. I do not think you can get results from a physical standpoint. Maybe I am wrong but I think that is the reason you fail. They have tried it with barium and other things and have not had results. That which is absorbed can be measured. I think one will realize these more recent

materials will have little or no effect. You can apply more radiation and have the same effect. The secondary and scattered radiation will have an effect on the diseased as well as normal tissue. Any foreign substance injected will not give selective action to diseased tissue alone.

Dr. Williams (closing the discussion): I am sorry Dr. Clark is not here because in his department at the University of Illinois they are doing quite an extensive work in the line of photoelectric research, in which they are using mixtures of materials that are otherwise inert and then measuring the amount of chemical change after these materials are radiated. I do not know the exact situation but I believe Dr. Ellice McDonald, formerly of the University of Pennsylvania, is now in the new research institute of Du Pont and probably will carry on this same line.

As to the reaction of carbon dioxide, I am sorry I cannot answer the question. Dr. Clark could give that information. I believe eosin to be inert with the use of x-ray as far as any production of secondary radiation is possible.

In connection with Dr. Hilt's question relative to the measurement of the depth dose, you must remember that in depth dose you are measuring a rate of change, that x-ray is not a material, it is a force and that if you measure the depth dose at five centimeters and then at ten centimeters, you cannot subtract and get the amount of x-ray absorbed because no such thing exists. All you can measure is the rate of change of the rate of change. I can give you the mathematical formula for that if you want it.

Concerning the conclusions of Dr. Landaur and Dr. Compton, I would add to that Mr. Mayneord, Dr. Duane and other physicists. I would rather take the opinion of Dr. Regaud, a man who was a scientist and physicist and became a cytologist focusing his mind on the individual cell and what is happening to that cell. This field is just opening again. It has been opened and closed and opened and closed. I think every physicist has closed it and slammed the door but I believe clinically it is a possibility if not a probability. Personally I intend to keep on working.

SEPSIS OF CRYPTOGENIC ORIGIN

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Despite the most careful medical analysis every clinician encounters patients with fever the origin of which he is unable to determine. Frequently, the diagnosis becomes apparent only after weeks or months of observation, and often even necropsy may fail to disclose the cause. Recognized in 1878 by Leube[1] cryptogenic sepsis has been reported mostly in infants and children by Turnbull,[2] Copeland,[3] Sally,[4] Rawlings,[5] Greenberg[6] and others. Copeland would have us explain these obscure fevers under the diagnosis of nervous instability after all causes have been carefully excluded. Cooke,[7] on the other hand, states that "Cryptogenetic septicemia in which the primary focus remains hidden . . . is more frequently encountered with hemolytic streptococcus infections than those due to other organisms. It is possible that in some of these cases the portal of entry may have been the gastrointestinal tract."

Amongst the most frequent causes in childhood, as Epstein[8] and Scott[9] indicate, are febris neonarorum, congenital syphilis, rickets and scurvy, influenza, pyelitis, otitis media, incipient neonatorum, congenital syphilis, rickets and carditis, typhoid, malaria, intestinal toxemias, lymphadenitis, nasopharyngotonsillitis and sinusitis. Barbour[10] notes that pyelitis may be caused by ureteral obstruction in which case the urine may be negative for indefinite periods of time.

In their study of 173 children and adults discharged from the Peter Bent Brigham Hospital with the diagnosis of fever of undetermined origin Alt and Barker [11] discovered after follow-up examinations that the majority of these had tuberculosis, rheumatic infections, or malignancies. They found the low grade afternoon fevers often related to early tuberculosis, chronic sepsis, rheumatic infections, or malignant disease; the acute fevers to be caused by typhoid, miliary tuberculosis, tuberculous meningitis and bacterial endocarditis; and other fevers, to pyelitis, hypernephroma, malta fever, colon bacillus or meningococcus septicemia and hepatic fever.

The following case is instructive:

Charlotte V., aged 22 months, of normal birth, and the only daughter of healthy parents, had enjoyed freedom from illness except for an acute otitis media at the age of 1 year and an occasional cold since. Breast and bottle-fed during the first year, with cod liver oil and orange juice given at 1 month, the feeding history up to present age is faultless. Her teeth appeared, she sat up, talked and walked in the usual periods of time. The parents noted, however, that she had always been pale. On February 12, 1935, the father declared that the baby had suddenly become feverish and described the temperature as being so high that a cigarette applied to the skin would burn. The baby was irritable and cried but no other symptom was present. The temperature was 106.5°; the baby was alert and appeared well; the skin, very pale, hot and dry; the eyes clear; the ear drums normal; the nasal chambers negative; the tongue coated; the tonsils perhaps slightly redder than normal; no findings in the lungs or heart; abdomen soft and slightly

distended; no palpable spleen or tender kidney; reflexes normal; no Kernig or rigidity of the neck.

The following morning the temperature was 105.5°; the baby had cried all night. Physical examination failed to point to a diagnosis. That evening the temperature was 102°, the follow day 106.8°, and on February 15, 1935, 107°. On February 16 the child was brought to Englewood Hospital, active, playful, and in a surprisingly good physical state. Dr. Henry Boettcher found the ear drums negative, but performed a bilateral myringotomy and no serum or pus exuded. The temperature assumed a septic course, rising from normal to 105, 106, 107° daily. The white blood count was 18,050; the red blood count 3,900,000, color index 0.9; hemoglobin 70 per cent.; the urine showed a very faint trace of albumin with 20 leucocytes per high power field; the stools were negative for parasites and blood. The blood was negative for typhoid, paratyphoid A and B and undulant fever; the blood smears were negative for malaria; the differential blood picture showed 29 per cent. lymphocytes and 71 per cent. neutrophils and the erythrocytes showed marked achromia; the spinal fluid Wassermann was negative and the spinal fluid showed 2 lymphocytes per cubic millimeter; the blood cultures were negative. The x-ray of the mastoids on two occasions showed no infection; x-ray of the chest showed negative lungs and the heart slightly enlarged to the left. Flat film of the kidney region showed no evidence of calculi but the distention of the small bowel and colon suggested to Dr. R. J. Maier, the roentgenologist, peritoneal infection. The diagnosis was septicemia of cryptogenic origin.

On February 19, sixty cubic centimeters of father's blood was given intramuscularly with no effect on the temperature. On February 22 and 23 fifteen cubic centimeters of antimeningococcus serum and 10 cc. of antistreptococcus serum were given intramuscularly. The temperature now reached a maximum of 104° but on February 28 the temperature shot up to 106° with chill. At this point 20,000 units of dyphtheria antitoxin were given intramuscularly. The temperature continued to soar from normal to 105° daily. At the suggestion of Dr. Julius Hess, 100 cc. of father's citrated blood was given intravenously on March 6. The temperature (for the first time in 4 weeks) remained normal on March 6-9. On March 10 the child was discharged but the temperature at home began to resume its former course, reaching a maximum varying between 103° and 105°. On March 15 with a temperature of 105.2° the child was returned to the hospital and given 170 cc. of father's citrated blood intravenously. Promptly the temperature fell to normal, rising to 101° the following day by thereafter the temperature has been normal or very close to normal. On discharge from the hospital the white blood count was 10,750; the red blood count 4,300,000 and the hemoglobin 71 per cent.

Up to the time of the writing of this paper which is almost two years after discharge from the hospital the patient has been normal clinically. It is regrettable that intravenous pyelography was omitted in the clinical examination.

BIBLIOGRAPHY

1. Leube, W. O.: Zur Diagnose der "spontanen" Septicopyämie. Deutsches Arch. f. klin Med., 22: 235, 1878.
2. Turnbull, G. L.: A Case of Persistent Fever. Lancet, 2: 476, 1916.
3. Copeland, E. P.: Fever in Infancy. J. A. M. A., 67: 1346, 1916.
4. Sally, R. V.: Case of Periodic Attacks of Pyrexia. Lancet, 2: 386, 1917.
5. Rawlings, J. A.: Fevers of Infancy and Childhood. Southwestern Med., 2: 19, 1918.
6. Greenberg, D.: Prolonged Fever of Undetermined Origin. Medical Record, 97: 736, 1920.
7. Cooke, J. V.: Septicemia. Abt's Pediatrics, p. 529. W. B. Saunders Co. 1925.
8. Epstein, J.: Obscure Fever in Children. Med. J. and Rec., 130: 92, 1929.
9. Schott, C.: Causes of Obscure Fevers in Infancy and Childhood. Ill. M. J., 64: 486, 1933.
10. Barbour, P. F.: Pyrexias of Obscure Origin in Children. South. Med. J., 17: 256, 1924.
11. Alt, A. L., and Barker, M. H.: Fever of Unknown Origin. J. A. M. A., 94: 1437, 1930.

DIVIDENDS OF THE DEPRESSION

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It was ten years after the world war that the best and truest books dealing with it began to appear. We are now just beginning to see the great depression in its proper perspective. The things that have bulked largest when we have looked at the depression are the losses and liabilities to which it has subjected us. There are many who cannot think of these depression years through which we have been passing as anything but a major national calamity with no compensations of any kind. Nevertheless there are some assets that emerge. The depression has declared some dividends for which we cannot be too grateful. The material losses of the depression are still so close to us that it is most difficult to see things in their proper perspective. To me it is impossible to believe that from the events of these recent years that have been marked by untold financial loss and world-wide suffering we are to secure no present and lasting benefits, no strengthening of our character, no enrichment of our lives, no permanent blessings.

Notwithstanding all the evils of the depression I still believe in the goodness of God and the friendliness of the universe. God has not forsaken his world because men have lost their paper profits. An Old Testament writer once

Address, in part, given before the Englewood Kiwanis Club, Chicago.

said concerning a threatened calamity: "Howbeit our God turned the curse into a blessing." And so down through history again and again what men have thought only an evil has been divinely overruled for good. Let us look for the silver lining of the dark cloud ,and we will see that dividends more valuable than gold have been declared by the depression.

Dividends of Health. Emerson has said: "Health is the greatest wealth." One of the surprisingly great dividends of the depression is better health. At the beginning of the depression all social workers and health experts thought that reduced incomes and the worry of unemployment would result in a great increase in morbidity and mortality rates. But to the surprise of everybody, along with the depression began a marked improvement in the general health of the nation. Even a disease like tuberculosis, often associated with under nutrition, showed a decrease of eight per cent. in its mortality rate. President Hoover called the nation's attention to this surprising health improvement at the end of the first year of the depression.

More surprising, the excellent health record persisted in 1932 in spite of the depression. Vital statistics, which are the bookkeeping of life, showed the lowest death rate since our national recording of mortality statistics began, 10.9 per 1,000 estimated population. Chicago's average death rate for 1926 to 1929 was 11.9 and in 1932 dropped to 9.75 per 1,000, notwithstanding the larger number of suicides.

Still more surprising, in 1933 our national mortality rate dropped to 10.7, the lowest in our national history. The death rate from cancer, which had increased steadily for fifteen years, was temporarily halted in 1933. Also the world-wide increase of suicides which accompanied the depression was arrested. Chicago's death rate dropped to 9.5, the healthiest year in its history. Fewer babies died than in any previous year. Our low death record is more remarkable because seven and one-half millions of people were here at our Century of Progress exposition.

It is almost unbelievable that during the fourth year of the depression Chicago continued to be one of the healthiest cities in the entire world. Deaths from tuberculosis were fewer than during 1933. A survey of 46 cities showed a decline of four per cent. in tuberculosis deaths, the lowest yet recorded for large American cities.

Dr. Robert A. Frazer, chief medical director of the New York Life Insurance Company, said that 1934 took its place among the best years of our history. The same best years were 1931, 1932 and 1933 which, although depression years, broke all previous records of low mortality. With the gradual passing of the depression there came a slight increase in mortality rates in 1935. Both the birth rate of 13 and the death rate of 10.5 per 1,000 population were the highest in four years.

Our own national health record is not exceptional for the League of Nations' Statistical Year Book shows that in the fifth year of the depression the world death rate declined. Of 30 countries on all continents for which 1934 data are available the death rate, in all but three South American countries, was less than the average in the prosperous five years of 1926 to 1930 and in all but 13 it was less than in 1933. It may truly be said that through these depression years the health curve of the world has never fallen.

Hospitals, Doctors and Undertakers Lament. Our Chicago hospital records show that there has been less illness here during the depression years. Whole floors in nearly all of our hospitals have been closed for months at a time on account of lack of patients. No one who needed hospitalization has been turned away for financial reasons. Both credit and charity have been generously extended by our hosiptals.

In the doctors' room there has been heard a chorus of wails about the dreadful decrease of medical practice. A cynical friend suggests that perhaps people were healthier because doctors were not so busy. Perhaps he overheard the remarks of some facetious physician. I remember a few years ago at a social function, I congratulated a good old doctor on his health and vigor at 84 and asked him to what he attributed his wonderful vitality. He pulled my head down, for he was only about five foot five, and pretended to confide a medical secret, but answered in a loud whisper: "I don't take any of my own medicine!"

Referring to the great medical nihilist, who said that if all medicines were dumped into the sea it would be better for men and worse for the

fishes, I have admitted that in spite of taking some medicine I have not missed a full day's professional duties on account of illness during more than fifty years.

Not only the doctors but also those so-called "followers of the medical profession"—the undertakers—at a recent national meeting of their association, raised loud complaints and became regular Rooseveltian "calamity howlers" about the dreadful falling off in their funerals.

Depression Does Not Boost Insanity. Perhaps you are now willing to concede that there were fewer deaths during the depression, but you say: "Think how many were driven to insanity." Strange to say, a medical statistical study of the hospital records of a large number of cases of psychoses and psychoneuroses showed a smaller percentage of cases of mental illness caused by economic troubles during the depression than during the so-called luxury years.

Dr. Rotman, director of the Chicago Psychopathic Institute, reported in 1935 that the number of mental cases remained virtually stationery during the depression. There was no increase in insanity due to the depression. It may have produced more borderline states or what we call psychoneurotics and the lay public calls extreme nervousness, but no increase of psychotics or insane is apparent.

Dr. Gerty, superintendent of the Psychopathic Hospital, said that there may be more chronic cases in state institutions because their relatives are less able to care for them, but there are not more new cases committed. He reported that during the first four years of the depression there was a decrease in the number of patients in the Psychopathic Hospital, and whimsically said: "I think there were more 'crazy' persons during the boom period—who didn't know it, of course."

It is true that the mental depression that leads to suicide reached its nadir in 1932 when such fatalities were the highest on record. There were many to whom financial success had come easily and had never learned how to "take it on the chin." The easiest way out was a drop from a fifteenth story window.

As an old collegiate football and tennis player and amateur golfer I have always believed that we are prepared for the game of life by our defeats as well as by our victories. In fact, it often requires more sportsmanship to be a good loser than to be a winner. This thought suggests that there are not only physical, but also mental, moral and spiritual dividends of the depression that are still more valuable and which may lead some future historian to write: "It was a blessing in disguise."

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PHYSICAL PAIN AND MENTAL SUFFERING IN WORKMEN'S COMPENSATION CASES

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An employee had been injured by a fall while lifting on a machine, suffering a badly wrenched back and a swelling in the groin. In due time the insurance carrier had stopped payment of compensation upon the ground that claimant's disability had ceased, and that he was able to return to his former occupation. Claimant resisted.

Before the Commission the employee testified that an operation had been successful, but that his kidney pained him continually, that he had attempted in vain to work at his former employment, but that he had been forced to seek lighter and other work.

The remaining trouble was thought by medical experts to be purely mental. A large neurasthenic element was believed to be responsible therefor, since the employee had shown a decided tendency to be dissatisfied with the medical care. He had been discharged from the hospital "in order to aid him in getting the right onlook on life."

Manufactured symptoms, exaggeration of those being present, their false interpretation by the claimant, his morbid introspection in regard to the future, his lack of courage and energy to throw off his mental trouble, the tendency to be querulous, and particularly the great obstinacy with which these conditions resist any attempt at cure—all these factors put the insurance carrier upon his guard as to the genuineness of the physical pain and mental suffering.

There is a difference between malingering and similar states of mind in which the elements of

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complete, intentional and conscious simulation are missing. Thus, a hysterical woman who claims that she cannot bear the slightest touch and then hardly feels the strongest pressure when her attention is diverted would hardly be called a malingerer by any physician. A similar thing occurs in accident neuroses, since there are analogous conditions.

The industrial injury lays the foundation for the employer's liability. However, pre-accidental facts may have some value in estimating the good faith of the workman. Lack of symptoms of any nervous trouble prior to the fortuity together with a sufficiently serious trauma likely to incite a neurosis supports somewhat the inference of an honest claim.

The proved existence of a preexisting infirmity may have more than one meaning. Claims based upon ailments, alleged to have become aggravated by the accident, are not necessarily fraudulent, when the intensity of the nervous trouble is at issue. The disease may have been slight and slow in its progress as long as left to its own course. Natural remissions, or medical treatments, may have kept the patient in comparatively good health. There may have been little or no mental suffering or physical pain.

On the other hand, a workman may have carefully studied the symptoms of his preaccidental ailment with a view of utilizing his knowledge in a litigation to come so as to obtain inequitable compensation benefits. Or, there may have been fraud in making a claim in another litigation so that from such circumstance one may infer wilful and intentional exaggeration in a proceeding involving a truly industrial injury.

Other facts may help in fastening bad faith upon the claimant. He may belong to a class of people who are more likely to be afflicted with a certain preexisting nervous malady than other persons. The conclusion of suffering, or its intensification, by reason of the employment, thus may become weakened or even refuted. Nationality and race exert some influence. Individuals of Nordic extraction, for example, are said to be less subject to hysteria than those of the Jewish race or the French. Whether the station of life should be given any weight, however, appears to be doubtful, though it has been asserted that women of the higher classes are more prone to exhibit signs of hysteria than those of the lower walks of life.

Regardless of the question whether or not there is a preexisting disorder, the post-accidental events throw some light upon the evaluation of good or bad faith. The intensity of the morbid changes in the nervous system may be accounted for by some physicial lesion of the brain, spinal cord, or peripheral nerves. An anomalous structure may have formed. Complications may have set in so as to cause a considerable drain of nervous energy. Or, nervous suffering may be explainable as a manifestation of the transitory stage between complete physical recovery and the adjustment by the corresponding brain cells to the new state of health. Here, medical science establishes fairly well the good faith of the claimant.

In other cases there is no detectable pathology. This lack of objective findings is avidly taken up by the defence which contends that there is the intervention of a new and independent cause, represented by the patient himself, who thus breaks the continuity of the chain of events and frees the employer from liability pro tanto or in toto.

Unfulfilled desires in our large social existence, unrelated to work, personal wishes of success, when thwarted by the employer or otherwise, inability to advance one's position all lead to resentment towards industrial enterprises. The accident is only the fuse which causes these ungratified wishes to transform themselves into a psychoneurosis. There may have been a discharge from the employment after the accident. Anticipation of injury arises out of working among dangerous machinery. Psychic contagion is a contributing factor. Accident neuroses amongst employees of corporations are said to be uncommon in comparison to the frequency amongst injured "outsiders."

The workman acquires the feeling of insecurity and fear; there is subconsciousness of potential future litigation involving his own injuries. The desire to escape industrial hazards by means of compensation may become a veritable complex, though at first hidden from its victim. This "covetous wish" ought not to be compensated, as to do so would lead to a perversion of compensation legislation.

In other cases a "desire neurosis" develops. The employee things he is entitled to large damages. He nurses the conviction that social injustice has been done to him with a chance of now getting even. And the more difficult it is for him to barely support his family, the greater the desire for compensation. Expectation of gain, worries of litigation, the suggestions of physicians and the insinuations of lawyers serve to keep alive these mental processes.

Autosuggestion plays a role. The congratulations of sympathetic friends concerning his fortunate escape from more serious consequences induce the patient to develop in his imagination his suffering to a point where his slight pain becomes now very uncomfortable. He becomes restless, he cannot sleep and soon exhibits the picture of a complete emotional breakdown.

It may happen that the employee takes stock of the different states of mind he is going through, and that he recognizes the fallacy of his self-deception. The attitude of courts towards such an employee when aware of his self-imposition is, however, not uniform. In some jurisdictions only actual malingering will defeat. In others proof of intentional and wilful practices and of use of mental processes by which mental and physical infirmities are developed into injurious conditions is sufficient to deny awards, even though there is no actual intent to deceive. Another standard of compensability is that the workman must have an honest, fixed, definite and continuing belief that he is suffering from severe bodily pain, and that he is in such a disordered condition that he is unable to work. Consequently, bad faith in the employee originates when one single thought only is expressed in words or acts thus indicating that this fixed and continuing belief is interrupted by doubt.

Brooding over the effects of the injury has been held not to be compensable in a British case. But, worrying and starving so that death results was in Massachusetts held not to be fatal to an award. The fact that the employee has not sufficient will-power to throw off his troubles does not exclude good faith in absence of some evidence of wilfulness. However, "litigation neurosis," according to a New York decision, is not a part of compensable injuries.

Words and acts of the employee must establish the fact of bad faith. Being able to drive a car, when a patient is fitted with a brace, does not suggest fraud per se, particularly when the patient has been carrying himself in the same stooped position over a period of months.

Even the fact that the workman does not complain immediately after the industrial calamity does not impeach his good faith. Nervous disorders of the sort under discussion do not come on contemporaneously with the accident, or immediately thereafter. But, if they do, their causal connection with the employment is questionable to a high degree. It is, therefore, not absolutely a suspicious circumstance that the employee continued to work for a while, or that he seeks the aid of the commission after having made a settlement.

The theory is that the workman's ability to earn a livelihood must be restored as far as possible to its preaccidental state in order to warrant discontinuance of compensation. Judging from an Illinois decision, surgical or medical treatment, if inefficient to cure the physical pain or mental suffering, should be superseded by mental suggestions, psychotherapy, Christian Science, or mental cults of whatever description. Proof of cure of the bodily ailment, a practice not uncommonly indulged in by insurance companies in attacking the good faith of the workman, would then be insufficient to infer fraud, actual or constructive. But even when psychotherapy has been used without success, no bad faith should be presumed from mere bad results. The task of rëeducating such patients may require much time and may be futile nevertheless. If mental treatment is of no effect, the burden must be borne by industry rather than by its individual servants.

In the opening case the employee's mental attitude was a part of an injury arising out of the employment. From the dissatisfaction with the medical care one might possibly infer bad faith. Yet, there were attempts at work. The operation left some nervous impairment. Finally, doctors expressly excluded malingering. The order of the Commission that further payments of the full amount of compensation be made, was reversed with directions to grant a smaller sum, since the claimant had not yet recovered fully.

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PRESENT STATUS OF IMMUNIZATION AGAINST CONTAGIOUS DISEASES

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In discussing immunization it at once becomes apparent that we must consider the result we hope to obtain, immunity.

Immunity is that defensive force of the body which protects against the ill consequences of infection.

Infection is the entrance into the body and the development of pathogenic consequences of bacterial invasion.

Bacteria then, to cause pathogenic consequences, must be of the proper strain; they must have proper selectivity, be in suitable numbers, have adequate resistance, be capable of rapid multiplication, and of high virulency; the intensity of the infection depending, of course, upon the variance of the above factors.

The strain of bacteria will, in most cases, determine the selectivity. Different strains of the same bacteria vary in their selectivity and therefore cause different diseases, as we now classify them.

Bacteria, to be effective, must be contacted in suitable numbers and the number contacted determines the initial dosage. Bacteria must have an adequate resistance to withstand the fight of the defensive forces of the host and the greater this resistance the more severe and prolonged will be the illness.

Virulency, or fighting ability, of the bacteria is an important factor as regards the outcome of the infection and probably has more to do with toxicity than any other single factor.

Bacteria, to be potent, must also have a strong invasive power, or adept quality of gaining admission into the blood-stream.

Should an individual become exposed to bacterial contamination he, himself, may not become contaminated but if he does the consequences depend first upon the "invasive power" of the organism. Should this invasive power be low he will either become a carrier of the organism, for an indefinite period of time, or he will develop only a mild, local infection; i. e., as an inflamed throat. If the organism has a high invasive power he will develop anything from a local condition to a severe systemic disturbance, depending upon other qualitative factors of the organism.

On the quantitative side, contamination with a few bacteria does not constitute the dosage of many bacteria and so the consequences of such an infection should, from the bacterial point of view, be light or nihil. Should the contamination be quantitatively low but with high invasive power, resistance, virulency and ability of rapid multiplication, then the consequences depend entirely upon the defensive forces of the host. Thus must we consider infection on both a qualitative and a quantitative basis.

The virulence of the organism must be determined by the quantity and quality of toxin it produces in the host and also upon its ability of rapid multiplicity and penetration of the body defenses. Toxins must be liberated faster than antitoxins are formed; multiplication must be more rapid than the natural death rate of the organism.

True virulency depends upon the ability of the organism to secrete and excrete substances which are toxic to the human tissues. Exotoxins are such substances; they are extra-cellular and usually give rise to symptoms only after a period of incubation. Endotoxins are thought to be products of cell disintegration but may be obtained by cell extraction. Some bacteria, such as the streptococcus, are said to be virulent because of their ability of rapid multiplicty, and that they overwhelm the host with disintegration products and neutralization of the body defenses.

Immunity, as generally accepted, means the resistance of an individual through his body defenses to infection and is of two varieties; i. e., general and specific.

General immunity is usually inferred when we speak of the individual's "resistance." The factors in immunity are, for the most part, however, usually specific except those offered by healthy mucous membranes, and the effects of body chemistry as it relates to the secretions. General immunity, as it relates to infections in general, is probably a factor in the severity and duration of illnesses and is of import in rapidity and completeness of recovery. Thus we speak of high or low resistance of an individual, meaning degree of susceptibility to infection in general as it pertains to his general, body functions. Wherefore, we are dealing with physical chemistry and not with antibodies, antitoxins or anti-

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gens. If we are attempting to build up resistance, or general immunity, in the host we must use general agents to accomplish our purposes, but should we attempt specific immunity we must then resort to specific agents which we know will immunize to specific infections or bacteria.

Specific immunity means body defenses that protect against certain types of infection, or against typical strains of bacteria which always cause like consequences in different hosts. Specific immunity may be generally classified as natural and acquired.

Natural immunity is that defense which nature bestows upon an individual or race through, perhaps, many causes and which are usually unknown. Most children are, at birth, immune to many infections and this may last for a few weeks or months only or it may endure into later years or throughout life. We do know that it is usually not permanent. In the newborn natural immunity is thought to be transmitted through the blood of the mother, particularly if her bloodstream contains those protective substances necessary to produce immunity. This type we designate as congenital immunity. It is possible that the mother's milk, in breast feeding, also carries the immune substances to the child, providing the mother is also immune. This, I believe, explains why the average infant, during the first year of life, is immune to diphtheria, measles and other of the contagions.

Race also has a strong influence on natural immunity as certain races seem well protected against certain infections while others, having a low degree of natural immunity, succumb rather rapidly. Possibly living conditions, location, food and lack of contact may be partially the answer.

Acquired immunity interests us most as physicians in that it is a practical means of reducing morbidity and in many cases preventing mortality. It offers the means, though neglected, of enhancing the value of preventive medicine and it is the duty of every practicing physician to give it more heed. At the present time it is, unfortunately, applicable to only a few of the more dreaded infections but in time the scope of this field of medicine will widen. Acquired immunity may be produced either passively or actively.

Passive immunity is artificial, usually immediate, of short duration; is accomplished by inoculation with large doses of antitoxin and is directed toward a specific infection. It reaches its height of protection within a few hours and then gradually, through the eliminative processes of the body, loses its potency and after two or more weeks the individual returns to the susceptible status. The antitoxin acts merely as a temporary protective substance while in the body, diminishes rapidly as a defensive force and does not stimulate the body forces to increased production of protective substances.

Active natural immunity is induced by the contraction of certain diseases as measles, scarlet fever, chickenpox or smallpox and while this immunity is practically always complete and lasting there are instances where it is only partial and of indefinite duration. This may be due to the infection or it may be due to the reaction of the host, or to both. Again the individual may contract the infection, may not react sufficiently to become ill or even show any typical, clinical symptoms and develop either a complete or partial immunity. If the immunity is complete it may be permanent and protect against further occurrence of the disease; or the complete immunity may be lost entirely or become partial, in which case chance will determine freedom from a repetition.

While some infections do confer immunity, either complete or partial, many do not do so but rather increase the susceptibility, as for example pneumonia, influenza, tonsillitis and the common cold. Active natural immunity, it is thought, may be produced by either large or small, frequent doses of a virulent bacteria and this we call *relative immunity.*

Active artificial immunity may be produced by either active or inactive cultures, or by some product of the bacteria. In some cases immunity to a disease may be produced by the products of bacteria, or the bacteria themselves, which are responsible for, or the causative agent of, another disease. Active artificial immunity is the type which falls within the physician's province to administer. It is the type that can, and should, be produced before infection is contacted. It is produced by inoculation of the susceptible host with some product of the infective organism whereby the body defenses are stimulated for the production of antibodies. As contrasted to passive immunity which is used for immediate and temporary protection, active artificial immunity is produced as a slow but lasting protec-

tion. Its action seems to be cumulative over a period of time and is thought to endure for from a few years to a life-time.

Production of immunity: For the production of immunity we use, at the present time, either a vaccine or a toxin depending, of course, upon the specificity of the immunity to be conferred.

Diphtheria: Of the contagions diphtheria is one of the most urgent to demand attention. In immunizing against this disease we may use one of three agents, i. e.,—toxin-antitoxin, toxoid or alum precipitated toxoid. In children of eight years or older perhaps toxin-antitoxin is preferable because of lessened danger of, and a milder reaction to, its use. When used it should be given subcutaneously in doses of one c.c. three weeks apart and for 3 doses. Toxoid may be used and has the advantage of producing a slightly higher rate of immunity. Its recommended dosage is 1 c.c. subcutaneously, every three weeks for two doses. Personally I believe that 3 doses are preferable in that a higher rate of immunity is obtained from this amount. Alum precipitated toxoid may be said to be the successor of the other two, has the advantage of lessened dosage and possibly a higher rate of immunity. One injection, subcutaneously, of one-half to 1 c.c. is recommended but in some individuals two doses give a higher and more lasting immunity. I have adopted the policy of two doses of from ½ to 1 c.c. of alum precipitated toxoid in all children under eight years old, the second dose in three weeks following the first.

Because of the rapid loss of natural immunity following birth, the higher incidence and the serious consequences of infection in the low age groups, inoculation is urgent and should be done at, or about, six months of age. With alum precipitated toxoid immunity reaches its height in from 3 to 4 months and includes about 95% of those inoculated.

The most acceptable method of inoculation, at the present time, is by the subcutaneous route. However, some physicians use and recommend the intradermal method and claim for its use less reaction. If used intradermally the customary dose of alum precipitated toxoid is one-tenth that of the subcutaneous, and in this dosage it is said to be just as potent, causes less reaction in the older groups, and is particularly adapted to allergic individuals. Toxoid should not be used intramuscularly because of the increased danger of local reactions.

Schick Test: The Schick test is a fairly reliable guide as to the susceptibility of an individual to diphtheria. Proper technic should produce a small bleb which, in susceptible individuals, will give a true reaction in from 48 to 96 hours. This reaction is thought to give a fair indication of the amount of circulating antitoxin in the blood-stream of the individual, but is not as definite, in certain cases, as is assumed. In some infants the Schick test may be negative, even where there is a lack of circulating antitoxin because of low reactive power of the skin, or it may be possible to obtain a positive reaction with a high circulating antitoxin due to a hypersensitiveness of the skin to diphtheria toxin. The latter result, however, would tend to predominate in the adult. In spite of these unreliable factors, the Schick test is our only guide to immunity and should, for this reason, be used.

In infants and young children this test should be ignored unless, or until after, toxoid has been administered. This test should, however, be administered in about six months following toxoid inoculation and should be repeated each year thereafter through the pre-school period and/or until a certainty of immunity exists. Thereafter it should be repeated at intervals of two or three years throughout childhood, and at the time of diphtheria epidemics. The technic consists of introducing, hypodermically and intracutaneously, about one-tenth of a c.c. of diphtheria toxin into the flexor surface of the forearm. I mention pseudoreactions only to warn against misinterpretation.

Smallpox: I speak of smallpox immunity in the light of neglect. Because of the relative infrequency and the decreased severity of smallpox a laxity of vaccination has become apparent on both the part of the physician and the layman. Unless active immunity is constantly being conferred smallpox may, in succeeding generations, become rampant.

The best technic for vaccinating, I believe, is by the single or multiple pressure methods. This is best done with a small blunt instrument such as an optician's screwdriver. After sterilizing, the content of a vaccine tube is placed upon the site of vaccination. The instrument is then placed upon the skin under the vaccine, moder-

ate pressure exerted and the instrument rotated. This causes a small break in the skin with a consequent exudation of serum. Several breaks may be made and the vaccine rubbed in if thought desirable, but this is not necessary. The vaccine is allowed to dry before any protection is placed over the point of inoculation. This is a modification of the old Von Pirquet test. A negative result does not necesarily indicate immunity unless the individual has a typical vaccination scar or has had smallpox, and even in such cases may be due to faulty technic or impotent vaccine.

A typical vaccination scar is one that is elevated, pale, dull and pitted. The size of the scar is not important. An atypical scar is usually large, depressed, shiny, without pits; is the result of an infection and no guarantee of an immunity.

Vaccination should be repeated one or more times if negative and where no reason for immunity is known, during an epidemic or upon frequent exposure to smallpox.

Whooping Cough: Immunization against pertussis is a rather recent accomplishment. Attempts have been made with various substances for a good many years, but none were successful to the degree of reliability. We now have an agent in authorized commercial vaccine, the credit for which goes to Dr. Louis W. Sauer, which is reliable in better than 80% of cases according to reports.

This vaccine is given in three weekly, bilateral, subcutaneous injections. For children under 3 years, 8 c.c. is probably sufficient, 1 c.c. in each arm for the first dose; 1.5 c.c. in each arm for the second dose; and 1.5 c.c. in each arm for the third dose. In children over 3 years of age I feel that it is wiser to use 10 c.c., increasing the second and third doses to 2 c.c. bilaterally. At least four months must elapse before immunity is fully established. Reactions, both general and local, are at times encountered, but I have seen none severe enough to be of any consequence. This vaccine should be given during the first year of life at about nine months of age. Kreuger's vaccine seems to act very well as a therapeutic agent, but from reports is not so efficient in establishing active immunity.

Scarlet Fever: Immunity is accomplished quite successfully, according to reports from large institutions in different parts of the country, by giving five inoculations, at weekly intervals, of scarlet fever toxin. The Dicks recommend 500, 2000, 8000, 25000 and 80000 skin test doses to be given successively. While most health departments and some private physicians urge its use, my personal attitude is that it lends itself admirably to institutional procedure, but its use in private practice should be with caution. An objectionable feature in office or home use is the necessity of five doses. Many parents hesitate to submit their child to a series of five injections and of those who start, many discontinue before the process is complete. The fear of reactions, by many physicians, I believe is well founded, for we do get many, and some well marked reactions, both local and systemic. In some individuals only slight reactions, as slight rise of temperature and rash are noted; in others moderate reaction, as denoted by moderate temperature, lassitude, rash, nausea and vomiting; while in still others severe reactions take place, as manifest by high temperature, vomiting, diarrhea and prostration. Local reactions, of which the percentage averages around 25, are in the nature of redness, swelling, marked tenderness and local pain. In my experience less than 50% get no reaction whatever. As a rule, the first two or three injections cause little or no trouble, the later inoculations causing the more marked reactions. When given, parents should be warned of the likelihood of reactions.

Ricinoleated antigen has been tried for active immunization but was found to produce an immunity of short duration, and the reactions following its use were rather severe. Friedman et al. state that percutaneous and nasal administrations of the toxin have some immunizing power, but the oral route is unsuccessful.

Scarlet fever antitoxin may be used for passive immunity or for treatment, but if so, marked reactions may be expected.

As to the period of immunity, when conferred by scarlet fever toxin, the time is not definitely known, but is supposed to be lasting in many individuals, while indefinite or soon lost in others. Of course, this fact alone should not be a deterrent in giving the inoculations, as we know that scarlet fever does not, in some individuals, produce a lasting immunity.

For passive immunity against scarlet fever probably the best procedure is the injection of from 10 to 20 c.c. of convalescent serum. If

given early after exposure its efficiency is almost 100% and protects for about two weeks.

Measles: As yet there exists no proven method of producing active immunity to measles. However, there has been developed an immune globulin from human placenta which does, from reliable reports, produce a partial passive immunity in a fair percentage of individuals, modifies the severity of the disease and tends to prevent complications. Four c.c. or more is injected into the gluteal muscle, the partial immunity lasting for from 3 to 4 weeks. In treatment for measles McKahann recommends a dosage of 2 to 4 c.c., repeated at the discretion of the physician. Immune globulin is equally or more efficacious than either adult or convalescent serum.

250 North Water Street.

DISCUSSION

Dr. John R. Vonachen, Peoria: From a practical standpoint we must be well informed on immunization against contagious diseases because the laity of the present day are hungry for information. I always make it a point to explain to my patients that no immunizations are 100% perfect, and that failures can be expected. Each physician should have a preventive medicine outline to present to his patients particularly during the first year or two of life. Ordinarily, I immunize my infants between six and seven months against diphtheria, between nine and ten months against whooping cough, and vaccinate them against smallpox between eleven and twelve months. If one finds, however, that one or the other is more prevalent in the community, the whooping cough, diphtheria immunizations can be reversed. Now as to the type of material to use. Generally speaking, alum precipitated toxoid confers an immunization from 90 to 95%; plain diphtheria toxoid about 90%, and diphtheria toxin-antitoxin about 87%. The children over five years of age in my experience oftimes have quite severe reactions from the alum precipitated toxoid, and I believe these cases should be given the plain diphtheria toxoid, two injections three weeks apart. There have been many reports in the literature of abscess formation and nodule formation following alum precipitated toxoid. In some cases this has been attributed to the particular batch of toxoid. Some contend that the child from the age of ten to fourteen years should be given diphtheria toxin-antitoxin.

Just a few words about the Schick test. It is far better to encourage our patients to read this test no earlier than forty-eight hours, and preferably seventy-two hours to avoid a wrong impression of false reactions. In regard to whooping cough immunizations, it is now generally conceded that the failures are only about 3.7%, so this is a prophylactic measure which can be well recommended to patients, without any ill effects from its use. The usual dosage familiar to all of you is ordinarily to use a vaccine containing ten million organisms to the cc, giving 1 cc in each arm for the first injection, then for two succeeding weeks 1½ ccs in each arm, making a total of 8 ccs. This ordinarily confers immunity in from three to four months, after the final injection. It might be interesting to know that Dr. Frawley of Fresno, California, reports good results with Krueger's whooping cough endantigen in the treatment of the disease, in that the cases can be rendered mild by giving 5 ccs twice a day, up to a total dosage of 60 to 80 ccs. This produces results when given after exposures up to one week after infection but not later. He emphasizes that these whooping cough cases with upper respiratory infections do not respond so well to this treatment.

In conclusion let me say that a great part of your effort in obtaining results with both toxoid and whooping cough vaccine is to keep these materials properly refrigerated. Do not carry them around promiscuously in your daily kits.

WHEN THE SLIP GETS BY

The typographical error is a slippery thing and sly,
You can hunt till you are dizzy, but it somehow will get by.
Till the forms are off the presses it is strange how still it keeps;
It shrinks down into a corner and it never stirs or peeps,
That typographical error, too small for human eyes,
Till the ink is on the paper, when it grows to mountain size.
The boss he stare with horror, then he grabs his hair and groans;
The copy reader drops his head upon his hands and moans—
The remainder of the issue may be clean as clean can be
But that typographical error is the only thing you see.

—Knoxville (Ia.) *Express.*

THE SMALL INTESTINE

Eugene P. Pendergrass, Philadelphia (Journal A. M. A., Dec. 5, 1936), points out that relatively little investigative work has been done on the small intestine by roentgenologists, and because of this the interpretation of its lesions is much more difficult than of other portions of the gastro-intestinal tract. Consequently, only obvious lesions have been diagnosed. It is essential that collective studies be made of the small intestine in healthy individuals and in patients having lesions of the small intestine. Lesions involving other portions of the gastro-intestinal tract as well as conditions outside of it may exert a profound influence on the mechanics and pattern of the small intestine. Any investigation, therefore, should include a careful consideration of all such factors. A standard meal is suggested, so that one roentgenologist may compare his results with those of another. The pattern of the small intestine will vary considerably, depending on the composition of the foodstuff it receives. It varies also with

the consistency of the meal, its size, the gastric emptying time and the tonicity of the intestinal tract. Certain pathologic conditions which only indirectly affect the intestinal tract may cause a very profound change in the small intestine pattern. The meal that the author uses consists of 5 ounces (140 Gm.) of barium sulfate and 5 ounces (150 cc.) of water. Such a meal has the consistency of a thick pabulum but allows excellent visualization of the mucosal pattern. The small intestine not only plays a major rôle in preparing foodstuffs for digestion but it is also the portion of the gastro-intestinal tract which is most active in the absorption of the products of digestion. The examination of the small intestine requires several hours as a rule, and occasionally its physiologic function has been disturbed as a result of the patient having developed a headache because of food being withheld. What part psychic or emotional disturbances may take in influencing the motility and pattern of the small intestine is not known but there is reason to believe that fear is occasionally a potent factor.

METHODS IN SPERM ANALYSES AND EVALUATION OF THERAPEUTIC PROCEDURES

Robert S. Hotchkiss, New York (Journal A. M. A., Dec. 5, 1936), states that the purpose of any study of infertility is not only to detect absolute sterility but rather to arrive at an estimation of the relative fertility of each partner, each to be considered separately and together as a marital unit. The appraisal of the semen constitutes the chief and final index of male fertility. A routine semen analysis should include the following details: 1. The average volume of the ejaculate is from 3 to 4 cc. Variations from one or two drops to 10 cc. are encountered. Specimens of less than 0.5 cc. in amount fail to produce an adequate seminal pool, which ordinarily provides a medium for the survival and protection of the sensitive sperm. 2. The appearance and viscosity of the fresh ejaculate is entirely different from that one-half hour old. Self liquefaction is then completed, much to the benefit of motility of the sperm. If the eventual motility is of a good grade it is likely that variations in viscosity have little or no clinical significance. 3. The *p*H of a seminal specimen usually falls within the range of from 7.7 to 8.5. If no motility is found it is of particular importance to obtain a *p*H determination, for in rare instances a shift to a low reading of 6 and 6.2 has been found to be associated with necrospermia. 4. Interval examinations should be made to determine the viability of the sperm, which is usually about twenty-four hours at room temperature. 5. The number of spermatozoa is determined by the use of the usual equipment for counting blood cells. A sodium bicarbonate-phenol solution is used as the diluent; it destroys motility to permit an accurate estimation of the cells present in each cubic centimeter and in the total ejaculate. The average fertile male will produce from 100,000,000 to 150,000,000 spermatozoa per cubic centimeter or from 400,000,000 to 500,000,000 in the total ejaculate. 6. The examiner must be familiar with the variations in the morphology of the spermatozoa just as the hematologist is conversant with blood cytology.

SUNRAY HEMANGIOMA OF BONE, WITH SPECIAL REFERENCE TO ROENTGEN SIGNS

William E. Anspach Chicago (*Journal A. M. A.*, Feb. 20, 1937), studied the roentgenographic changes of hemangioma of the skull in a child aged 11 years in 1921 and again fifteen years later. Excepting for a large mass on the head, the patient's health has not been impaired in any way. Hemangioma of flat bones produces a sunray formation on roentgenograms. Hemangioma of long bones often produces a "loose soap bubble" appearance but almost as frequently the sunray pattern of density. The latter is often confused with osteogenic sarcoma of bone, which also produces divergent spicules of bone. While hemangioma is less destructive, slower growing and less painful and produces the more clearly outlined trabeculation, a biopsy should be obtained before removal is attempted. Rarely should hemangioma of bone be removed. When hemangioma involves vertebrae, a vertical striated appearance is produced which is almost characteristic of this one type of tumor. Therefore the kind of bone involved by the tumor in a given case is of prime importance in weighing x-ray evidence. Roentgen or radium therapy has the same favorable effect on hemangioma of bone as on hemangioma of soft tissue if treatment is instituted before dense bone is deposited within the tumor. Even later it is of definite benefit in arresting growth. The sensitivity of benign hemangioma to roentgen therapy must not be interpreted as evidence favoring malignancy.

Disturbances of iron absorption may occur during the course of alkaline therapy for peptic ulcer. When the upper gastro-intestinal tract is rendered alkaline as in the Sippy treatment of peptic ulcer, impairment of iron absorption and utilization results in anemia. This iron deficiency anemia closely resembles idiopathic hypochromic anemia. (Ed.: This would seem to indicate that iron by parenteral injection would be indicated in these cases.) Kellogg & Mettier, *Arch. Int. Med.*, 58:278 (August) 1936.

Society Proceedings

COOK COUNTY CHICAGO MEDICAL SOCIETY

Regular Meeting, Wednesday, February 3, 1937

PROGRAM

The History of Syphilis, B. Barker Beeson.

The General Picture of Syphilis, Frank J. Jirka, Director, State Department of Public Health.

Epidemiology, G. Howard Gowen, Assistant Epidemiologist, State Department of Public Health.

Wassermann Test and Its Interpretation, H. J.

Shaughnessy, Chief of Laboratories, State Department of Public Health.

Syphilis and Insanity, Francis J. Gerty.

Discussion by William Allen Pusey.

AMERICAN MEDICAL ASSOCIATION NIGHT

Introduction of Guests of Honor—Thomas P. Foley; J. H. J. Upham, President-Elect; William Allen Pusey, Past-President; Wilber Post, Past-President; Arthur Dean Bevan, Past-President; W. L. Bierring, Past President.

Forward, Olin West, Secretary and General Manager American Medical Association.

535 North Dearborn Street—Modernized and Enlarged, Austin A. Hayden, Secretary, Board of Trustees, American Medical Association.

The Legislative Committee's Work, Edward H. Cary, Chairman, Committee on Legislative Activities, American Medical Association, Dallas, Texas.

Your American Medical Association, Charles Gordon Heyd, President, American Medical Association, New York City, New York.

General Discussion, Morris Fishbein, Editor, Journal American Medical Association.

PIKE COUNTY

The Pike County Medical Society met in Pittsfield, January 28, when the following program was given by Jacksonville physicians.

Pneumothorax in the Treatment of Tuberculosis by Friedrich Engelbach.

Otitis Media in Children, by George L. Drennan.

Preventive Surgery by Carl E. Black, with discussion on the latter paper led by Vincent T. Lenth.

These papers were all very well given and received with interest by all present.

In the business meeting which followed the program action was taken supporting the Council in the resolution in regard to the proposed change of the United States Public Health Service from the Treasury Department to the proposed Department of Public Welfare and in regard to the establishing of a Department of Public Health.

All members of the profession resident in Calhoun County who are affiliated with organized medicine being members of the Pike County Society, it was voted to change the name of this Society to "The Pike-Calhoun Counties Medical Society."

In the annual election of officers the following were elected: President, Wm. Skeele, Hardin; vice-president, L. Y. Davis, Baylis; secretary-treasurer, F. N. Wells, Pittsfield; delegate to state meeting, P. V. Dilts, Pittsfield; alternate, J. S. Altman, Pittsfield.

F. N. WELLS, *Secretary.*

Adjournment was taken, to meet again in Pittsfield April 22.

Marriages

ROLAND LINCOLN KESLER, Chicago, to Miss Margaret Lee of Gordon, Neb., Nov. 14, 1936.

EMMET F. PEARSON, to Miss Mary Louise Maxon, both of Springfield, Ill., Feb. 20, 1937.

Personals

Dr. Ralph B. Bettman, Chicago, addressed the Whiteside County Medical Society at Sterling, January 18, on "Surgical Treatment of Empyema of the Chest."

Dr. Mark T. Goldstine, Chicago, addressed the Peoria City Medical Society, February 2, on "Pelvic Infections."

Dr. Ralph C. Hamill, Chicago, was re-elected president of the Illinois Society for Mental Hygiene at its annual meeting, January 21.

Dr. Frances A. Ford, Detroit, addressed the Chicago Council of Medical Woman, February 5, on "The Contact of the Average Physician with the Problem of Cancer."

Dr. Harold J. Noyes, clinical associate of pediatrics, Rush Medical College, addressed the Cleveland Dental Society, February 1, on "Modern Dental Contributions to Medical Diagnosis." Dr. Noyes also has a degree in dentistry.

The La Salle County Medical Society was addressed, January 21, by Drs. Robert S. Berghoff and Eustace L. Benjamin, Chicago, on heart disease and pathology of the common lesions of the heart, respectively. In the afternoon Dr. Berghoff conducted a heart clinic.

Dr. Daniel L. Sexton, St. Louis, addressed the Madison County Medical Society, Madison, January 8, on "Endocrinology in General Practice."

At a meeting of the Will-Grundy County Medical Society at Joliet, January 20, Dr. Milton Mandel, Chicago, spoke on "Pneumonia."

John McKinlay was elected president of the Presbyterian Hospital Association at its annual meeting, January 20, succeeding Alfred T. Carton, who resigned.

At a meeting of the Christian County Medical Society in Taylorville, January 27, Dr. Earl O. Latimer, Chicago, spoke on "Abdominal Pain from a Surgical Standpoint."

Dr. Alfred Adler of Vienna gave a lecture January 24, on "The Meaning of Neurosis." The lecture was under the auspices of the Chicago Association for the Study and Advancement of Individual Psychology.

Dr. R. P. Mackay gave a paper on "The Treatment of Neurosyphilis" before the Will-Grundy County Medical Society on January 27.

Dr. Earl O. Latimer addressed Christian County Medical Society on January 27, subject, "Abdominal Pain from a Surgical Standpoint."

Wr. William C. Beck and Orville E. Barbour presented the scientific program before the Henry County Medical Society on January 28, subjects, "Surgical Treatment of Peripheral Vascular Disease," and "Vomiting and Colicky Babies."

Dr. Earl A. Zaus addressed the Bureau County Medical Society on February 2, subject, "Coronary Sclerosis."

Dr. James J. Callahan addressed the Scott County Medical Society at Davenport on February 2.

Dr. Robert C. Levy gave a paper on "Pneumonia" before the Iroquois County Medical Society on February 2.

Dr. George J. Musgrave gave a paper on "The Nasal Accessory Sinuses," before the Will-Grundy County Medical Society on February 3.

Dr. Harry M. Hedge addressed the Aurora Medical Society on February 4, subject, "Diagnosis and Treatment of Syphilis."

Dr. I. M. Levin addressed the Norwood Park Parent-Teacher Association on February 11, subject, "Health Problems of Interest to the Parent."

Dr. Allan J. Hruby spoke on "Tuberculosis, How It Is Handled in Chicago," before the Public Health Chairmen of the Illinois Federation of Women's Clubs, February 8.

Dr. Daniel H. Levinthal has been invited to hold operative bone and joint clinics and lectures on orthopaedic surgery before the Tampico Medical Society.

Dr. Milton Mandel gave a paper on "Pneumonia" before the Will-Grundy County Medical Society at Joliet on February 10.

Drs. Maurice L. Blatt and William J. Dieckmann presented the scientific program at the February 10 meeting of the Jefferson-Hamilton County Medical Society, in Mount Vernon. Their subjects was "Neonatal Deaths" and "Obstetric Hemorrhage."

Dr. I. Harrison Tumpeer was guest of honor at the Inaugural meeting of the Oklahoma City Pediatric Society and presented "Interesting Pediatric Phenomena" with lantern slides at the Oklahoma University Club, Oklahoma City, January 29.

Drs. Fremont C. Chandler, Julius H. Hess and S. W. Becker were invited as guest instructors to the International Post Graduate Medical Assembly, held at San Antonio, Texas, January 26-27-28, 1937.

Dr. Ralph A. Reis gave a gynecological clinic for the Sioux Valley Medical Society, Sioux City, Iowa, and delivered an address on "The Third Stage of Labor," January 19, 1937.

Dr. Irving S. Cutter, Chicago, addressed the Peoria Medical Society, February 16, on "The Future of Medicine."

News Notes

—The dedication of the new $200,000 annex to the St. Francis Hospital will take place in May. Work was started last July. The present building of the hospital was constructed in 1923.

—Dr. Wingate Todd, Henry Wilson Payne professor of anatomy, Western Reserve University School of Medicine, Cleveland, delivered the thirteenth Lewis Linn McArthur Lecture of the Frank Billings Foundation, February 26. His subject was "Objective Ratings on the Constitution; Based Upon Examinations of Physical Development and Mental Expansion in the Growing Child."

—A meeting of the Society of Illinois Bacteriologists was held at the Chicago Woman's Club, January 23, with the following speakers:

—Dr. Oswald H. Robertson, professor of medicine, department of medicine, Division of Biological Sciences, University of Chicago, The Role of the Macrophage in Recovery from Experimental Lobar Pneumonia.

—Dr. Sol. R. Rosenthal, associate in the department of pathology, bacteriology and public

health, University of Illinois College of Medicine. Cellular Response in the Host to Antigenic Substances.

—James Russell Esty, Ph.D., research director, Western Branch, National Canners' Association, San Francisco, Bacteriological Problems of the Canning Industry.

—Fifty-four new typhoid carriers were detected in Illinois during 1936. This brings the number of carriers under state supervision to 162, according to the Illinois Department of Health.

—The Chicago Orthopedic Society and the Chicago Roentgen Society held a joint meeting at the Palmer House, February 15, with the following speakers: Drs. John A. Siegling, "Studies on the Development and Growth of the Epiphyses of the Long Bones"; John D. Camp, Rochester, Minn., "Roentgenologic Observations Concerning Intraspinal Protrusion of the Intervertebral Disk in Patients with Sciatic and Low Back Pain," and Myron O. Henry, Minneapolis, "Chip Grafts in Orthopedic Surgery."

—S. 8 proposes to grant to physicians and hospitals, treating persons injured through the negligence of others, liens on all claims, verdicts, judgments or decrees accruing to such persons by reason of their injuries. H. 21 proposes to authorize the sexual sterilization of persons convicted of forcible rape, incest, sodomy or taking indecent liberties with children. The bill also provides that nothing therein contained is to be construed to authorize the operation of castration or the removal of sound organs. H. 95 proposes to authorize the emasculation of persons convicted of the crime of rape, incest, taking indecent liberties with children, sodomy or the crime against nature. H. 97 proposes to appropriate $200,000 for the purchase of radium and radium equipment for the research and educational hospitals in Chicago.

The display window in the Marshall Field & Co. Annex Building now carries an interesting exhibit on THE HEART. Dr. Robert S. Berghoff loaned some unusual and attractive blue prints showing various conditons of the heart and Mr. Tom Jones of the University of Illinois loaned a very beautiful model of the heart. The window is worth seeing.

—A special program of lectures and demonstrations in surgery and medicine will be held under the direction of The Mayo Foundation from April 5 to 9, inclusive. Mornings will be devoted to surgical and medical clinics. In the afternoons and evenings, in addition to the clinico-pathologic conferences, symposiums will be conducted on urology, cardiology, gastro-enterology, dermatology, endocrinology, diseases of the colon and rectum, orthopedics and arthritis. Visiting physicians will be welcome guests.

The Gehrmann Lectures for 1936-1937 will be delivered in the Medical and Dental College Laboratories Building, 1853 West Polk street, University of Illinois, College of Medicine, Chicago, Illinois, in Room 423, on March 22, 23, and 24, 1937, by Dr. Thomas Parran, surgeon general, United States Public Health Service, Washington, D. C.

PROGRAM

March 22, Monday, 5 P. M.—"Health as a Factor in Social Security."

March 23, Tuesday, 5 P. M.—"Industrial Hygiene."

March 24, Wednesday, 1 P. M.—"Syphilis."

You are cordially invited to attend.

Deaths

SAMUEL D. DONOVAN, Dewey, Ill.; St. Louis College of Physicians and Surgeons, 1905; member of the Illinois State Medical Society; aged 53; on the staff of the Mercy Hospital, Urbana, where he died, Dec. 9, 1936, of carcinoma.

WILLIAM B. EICHER, Peoria, Ill.; Keokuk (Iowa) Medical College, 1898; member of the Illinois State Medical Society; aged 67; died suddenly, Dec. 7, 1936, in the Illinois Central Hospital, Chicago, of suppurative diverticulitis and multiple liver abscesses.

WILLIAM LYMAN GUILD, Wayne, Ill.; Bennett College of Eclectic Medicine and Surgery, Chicago, 1884; Chicago Homeopathic Medical College, 1892; member of the Illinois State Medical Society; surgeon to the Chicago, Aurora and Elgin Railroad; aged 77; died, Dec. 18, 1936.

COLEMAN LOVEJOY HOFFMAN, Oak Park, Ill.; State University of Iowa College of Medicine, Iowa City, 1903; member of the Illinois State Medical Society; veteran of the Spanish-American War; aged 58; died, Dec. 17, 1936, in the West Suburban Hospital of acute nephritis, uremia and Kümmel's disease.

SULLIVAN HOWARD, Elk Creek, Neb.; University of Denver, Colo., 1892. Practiced over 40 years at Elk Creek, Neb.; died, Feb. 2, 1937, of cerebral hemorrhage in St. Petersburg, Fla., and was interred in Macomb, Ill.; aged 71 years.

HENRY GROVER KURZ, Chicago; Chicago College of Medicine and Surgery, 1909; a Fellow, A. M. A.; aged

52; died, January 7, in the Dante Hospital, San Francisco, of rupture of a dissecting aortic aneurysm.

JOHN MICHAEL MURPHY, Chicago; Jenner Medical College, Chicago, 1914; for many years city health inspector and at one time head of the inspection department; aged 51; died, Dec. 30, 1936, of chronic myocarditis.

SAMUEL ALLEN OREN, Lewistown, Ill.; College of Physicians and Surgeons, Keokuk, Iowa, 1877; State University of Iowa College of Homeopathic Medicine, Iowa City, 1878; aged 82; died, Dec. 9, 1936, of diabetes mellitus.

JOSEPH P. PERCIVAL, Berwyn, Ill.; John A. Creighton Medical College, Omaha, 1896; a Fellow, A. M. A.; for many years connected with the Cook County Psychopathic Hospital, Chicago; formerly superintendent of the State Hospital, Norfolk, Neb., and the Chicago State Hospital; aged 71; died, Dec. 27, 1936, of bronchopneumonia.

GEORGE FREDERICK PIERCE, Chicago; Trinity Medical College, Toronto, Ont., Canada, 1895; on the staff of the Garfield Park Hospital; aged 70; died, January 2, of arteriosclerosis, diabetes and gangrene of the left foot.

ELZA CARL PORTER, Chicago; University of Illinois College of Medicine, Chicago, 1927; a Fellow, A. M. A.; served during the World War; on the staff of the Lake View Hospital; aged 38; died, Dec. 25, 1936, of lobar pneumonia.

EUGENE B. PRIBBLE, Salem, Ill.; Medical College of Ohio, Cincinnati, 1906; member of the Illinois State Medical Society; formerly member of the city council; aged 59; died, Dec. 30, 1936, of pneumonia, fracture of the hip as the result of a fall, and hypertension.

*THEODORE SCHAPS, Chicago; Julius-Maximilians-*Universität Medizinische Fakultät, Würzburg, Bavaria, Germany, 1920; a Fellow A. M. A. served during the World War; on the staffs of the Alexian Brothers' Hospital and the Evangelical Deaconess Hospital; aged 46; died, Dec. 11, 1936, of cirrhosis of the liver, gastric hemorrhage and pneumonia.

FRANK SMITHIES, Chicago; Chairman of the Section on Gastro-Enterology and Proctology of the American Medical Association, 1919-1920, member of the House of Delegates, 1927-1930, and in 1930 appointed a member of the Council on Scientific Assembly for five years, died, February 9, in the Augustana Hospital, of a cerebral hemorrhage, aged 56. Dr. Smithies was born in Elland, Yorkshire, England, Dec. 21, 1880. He received the medical degree from the University of Michigan Department of Medicine and Surgery, Ann Arbor, in 1904, and later studied abroad. He had been assistant in the clinical laboratory, instructor in medicine and demonstrator i n clinical medicine at his alma mater, assistant in medicine at Rush Medical College, Chicago, assistant in pathology at the University of Berlin, and attending physician to the University of Michigan Hospital. From 1910 to 1913 he was in charge of the gastro-enterologic laboratory and an assistant in one of the sections on medicine at the Mayo Clinic, Rochester, Minn. He was appointed gastro-enterologist in the Augustana Hospital, Chicago, in 1913, and attending physician in 1922. He became associate professor of medicine at University of Illinois College of Medicine in 1917 and professor of medicine in 1922. Dr. Smithies was a fellow and past president of the American College of Physicians and the American Therapeutic Society; member and past president of the American Gastro-Enterological Association; formerly secretary general of the American Congress on Internal Medicine, and past president of the American Society of Tropical Medicine. He was formerly physician in chief and head of the department of medicine at St. Elizabeth's Hospital, attending physician at the Henrotin Hospital, chief of clinic in digestive diseases at the Municipal Tuberculosis Sanitarium and consulting physician to the Chicago, Milwaukee, St. Paul and Pacific Railroad. During the World War he was consultant in medicine in the U. S. Public Health and Marine Hospital Service, Port of Chicago; secretary and consulting internist, Medical Advisory Board 3B, Chicago, and member of the Illinois State Board of Advisers in Administration of Draft. In 1930 he was appointed a foreign member of the Société medicale des hôpitaux de Paris and in 1933 was awarded the cross of t he French Legion of Honor. Dr. Smithies was the author of "Cancer of the Stomach" and of numerous articles and was editor in chief of the *American Journal of Digestive Diseases and Nutrition* and on the advisory board of the *American Journal of Tropical Medicine.*

WILLIAM GUILFORD STEARNS, Chicago; Northwestern University Medical School, Chicago, 1893; a Fellow, A. M. A.; professor of pathological anatomy and general pathology at the Northwestern University Dental School, 1894-1898, and assistant professor of mental diseases and medical jurisprudence at his alma mater, 1898-1900; lecturer of neurology at the College of Physicians and Surgeons, 1900-1902; fellow of the American College of Physicians; member of the American Psychiatric Association and the Central Neuropsychiatric Association; chairman of the section on insanity of the National Conference of Charities and Correction in 1898; served with the Medical Advisory Board No. 3E, Selective Service, as a consultant in neuropsychiatry, 1917-1919; assistant physician to the Illinois Eastern Hospital for the Insane, Kankakee, Ill., 1894-1895, pathologist, 1895-1897, and medical superintendent, 1897-1899; medical superintendent of the Oakwood and Lakeside Sanatoria, Lake Geneva, 1900-1904; medical director of the North Shore Health Resort, Winnetka, Ill., 1931-1936; aged 71; died, January 11, at his home in Evanston, Ill.

SAMUEL LOUIS WEBER, Chicago; College of Physicians and Surgeons, Medical Department of Columbia College, New York, 1888; a Fellow, A. M. A.; on the staff of the Hospital of St. Anthony de Padua; aged 75; died, Dec. 18, 1936, of coronary embolism and arteriosclerosis.

EDWIN F. WINEGAR, Chicago; Chicago Physio-Medical College, 1898; member of the Illinois State Medical Society; formerly on the staff of the Illinois Central Hospital; aged 70; died, Dec. 8, 1936, in a hospital at Phoenix, Ariz., of meningitis.